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SUPPLEMENT TO THE FLOWERING PLANTS OF MADRAS CITY AND ITS IMMEDIATE NEIGHBOURHOOD

BY

E. BARNES, B.Sc.

Madras Christian College, Tambaram

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† This number is being reserved for supplements to the Krusadai Island fauna.

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SUPPLEMENT TO THE FLOWERING PLANTS OF MADRAS CITY AND ITS IMMEDIATE NEIGHBOURHOOD

BY

E. BARNES, B.Sc.

Madras Christian College, Tambaram

(*Published—June 1938*)

INTRODUCTION

In 1929 there was no flora confined to the region round Madras City and only part of Gamble's Flora of the Presidency of Madras had been published. Consequently it was almost impossible for teachers, students and other interested non-specialists to identify most of the plants of the district. The Flora of Madras City was published in order to remove this difficulty. It was produced as the result of several years of study of the local flora, both on the field and in the herbarium in the Madras Museum. That it has been found not to be exhaustive was to be expected ; indeed, its chief value is probably that it forms a valuable starting point for the more complete study of the local flora. The writer of the present notes has, with its help, made observations for some years on the flora of the district immediately to the south of Madras City, chiefly in the Tambaram region. This area is now easily accessible from the city by electric train, and has itself become an educational centre. This supplement contains a description of 50 species and several varieties not included in the previous publication. A number of these plants are of special interest in that they have not previously been recorded from the East Coast. It appears that much still remains to be done before even the flowering plants of the district are completely listed ; there are, in fact, a number of plants reported in the Flora of the Madras Presidency as occurring near the city of Madras which are not included in the Flora of Madras City. It is hoped that further supplements, including one containing the grasses and ferns, will appear, and that eventually the area may be extended so as to include the whole of the Chingleput district. The present notes, however, do not extend the area covered.

In the Flora of Madras City a number of the descriptions are found to be too brief to give the amateur a sense of certainty in his identification. In this supplement, therefore, the descriptions are much more detailed, and with few exceptions they are of the living plant as found in this district. It is hoped that the student will thus be left with little doubt as to the identity of any of these plants that he may find.

The construction of a complete key for the identification by a non-specialist of the families and aberrant genera of all plants found in this area is a matter of considerable difficulty, and it is felt that in some parts the keys in the Flora of Madras City are not altogether satisfactory. No attempt has, however, been made to remodel these keys and to incorporate in them the plants in this supplement, as it is thought that this can be done more usefully when further supplements have made the list more nearly complete. Instead of a supplementary key the present volume contains, on pages 1 to 9, a series of notes which show how the additional plants can be distinguished from those included in the main volume. The differences used in these notes are not necessarily the most important scientific distinctions but are differences in characters that are easily observed. If reference

to the main volume has failed to lead to the complete identification of the plant, it will probably have indicated the genus or family to which it belongs. Reference should then be made to the notes on pages 1 to 9 of this supplement. The arrangement of these notes is based on the same system of classification as was used in the main volume, and the number of the page of the Flora of Madras City to which the student will probably have been led is printed in heavy type. It should, therefore, be a simple matter to extend the search from the main volume to this supplement. The page numbers in brackets after the plant names in these notes refer to the present volume and indicate where a description of the plant will be found ; the numbers followed by F.M.C. refer to the main volume of the Flora of Madras City (Bulletin N.H. II, 1929). In every case, after the use of these notes or keys, the plant should be compared with the description of the plant for as many characters as possible. Specimens of most of the plants described in this supplement have been identified at Kew and are kept for reference at the Christian College at Tambaram as well as in the Madras Museum. The general descriptions of families and genera are taken from the Flora of Madras Presidency but are slightly simplified ; those already found in the main volume are not repeated.

NOTES FOR DISTINGUISHING THE PLANTS DESCRIBED IN THIS SUPPLEMENT FROM THOSE INCLUDED IN THE MAIN VOLUME OF THE FLORA OF MADRAS CITY (BULLETIN N.H. Vol. II, 1929)

(Page numbers in heavy type refer to the main volume, those in brackets to this volume)

DICOTYLEDONS

Portulaceae

Portulaca Wightiana, Wall. (p. 10)

This plant differs from the species of *Portulaca* described on page **33**, F.M.C., in having its stems covered with white lanceolate acuminate chaffy scales.

Tiliaceae

Grewia rotundifolia, Juss. (p. 10)

This plant differs from the species described on pages **52** and **53**, F.M.C., in having broad 5-ribbed leaves grey-tomentose beneath, and 3-flowered peduncles severeal times as long as the petioles.

Leguminosae–Papilionatae

Crotalaria biflora, Linn. (p. 11)

In the key on page **83**, F.M.C., this plant traces down to *C. prostrata.* It can be distinguished from the latter plant by its pod which is sub-globose and covered sparsely with long hairs, and by its peduncles which have not more than two flowers. *C. prostrata* has oblong glabrous pods and peduncles with up to 4 flowers.

Sesbania procumbens, W. & A. (p. 11)

This plant differs from the three species of *Sesbania* mentioned on page **90**, F.M.C., in being a prostrate plant with flowers less than ·5 inch long.

Atylosia scarabaeoides, Benth. (p. 12)

In the key to the genera of *Papilionatae* on pages **74–76**, F.M.C., this plant traces down to 25. *Atylosia* differs from *Phaseolus* and *Dolichos* in having styles which are not bearded below the stigma.

Rhynchosia rufescens, DC. (p. 12)

Rhynchosia suaveolens, DC. (p. 13)

Rhynchosia cana, DC. (p. 13)

In place of the key for the species of *Rhynchosia* given on page **87**, F.M.C., the following should be used :—

1	Seeds without a caruncle	2
	Seeds having a caruncle	3
2	Leaflets rounded at apex	minima
	Leaflets acuminate at apex	viscosa
3	Calyx-lobes broad and almost hiding the corolla or pod	rufescens
	Calyx-lobes narrow	4
4	Peduncles with more than 2 flowers ; leaflets up to ·5 in. across ...	aurea
	Peduncles 2-flowered ; leaflets up to 2·5 ins. across	5
5	Pods having partitions between the seeds	suaveolens
	Pods indented between the seeds but without partitions	cana

Pterocarpus Marsupium, Roxb. (p. 14)

This plant may be distinguished from all other leguminous plants found in this area by the following combination of characters :—(*a*) an erect tree, (*b*) pods orbicular, broadly winged, usually one-seeded, (*c*) leaves having more than 3 leaflets alternately arranged. Page **74**, F.M.C.

Leguminosae–Mimosoideae

Mimosa rubicaulis, Lamk. (p. 15)

This plant differs from the two species of *Mimosa* mentioned on page **106**, F.M.C., as follows :—

From *M. pudica* in being a large bush.

From *M. hamata* in having leaves up to 6 inches long with pinnae and leaflets correspondingly large (*M. hamata* has leaves less than 1 inch long).

Halorrhagidaceae

Myriophyllum indicum, Willd. (p. 16)

In the Key to the Families beginning on page **3**, F.M.C., this plant leads to 9 (*Onagraceae*). The *Halorrhagidaceae* and the *Onagraceae* differ in that in the former each cell of the ovary has a separate style while in the latter there is only one style to the 1-6 cells.

Combretaceae

Anogeissus latifolia, Wall. (p. 16)

In the key for the *Combretaceae* on page **113**, F.M.C., this plant leads to *Terminalia Anogeissus* differs from *Terminalia* in that the flowers are in globose heads and not in spikes or racemes.

Passifloraceae

Passiflora suberosa, L. (p. 17)

This plant may be distinguished from *P. foetida*, Linn. (page **125**, F.M.C.) by its much smaller flowers and fruits, and by the absence of a glandular moss-like involucre of bracts.

Rubiaceae

Oldenlandia caerulea, Gamble (p. 17)

This plant traces down to 3 in the key on page **143**, F.M.C., but it differs from the plants following, in that its flowers are sessile and solitary or in 3-flowered heads.

Randia uliginosa, DC. (p. 17)

This plant differs from the two species of *Randia* described on page **146**, F.M.C., in being a tree and in having very much larger flowers and fruit.

Coffea Wightiana, W. & A. (p. 18)

Coffea differs from the genera of *Rubiaceae* mentioned on page **142**, F.M.C., in having only one ovule in each cell of the ovary.

Compositae

Epaltes pygmaea, DC. (p. 19)

This plant differs from *E. divaricata* (page **154**, F.M.C.) in being a much smaller plant with heads not exceeding ·2 inch across, and in having black smooth slightly angled achenes and not pale ribbed glandular ones.

Gnaphalium indicum, Linn. (p. 19)

This plant differs from other species of *Compositae* (page **149**, F.M.C.) found in this area in being a densely wooly plant only a few inches high.

Campanulaceae

Lobelia trigona, Roxb. (p. 20)

This plant differs from *Sphenoclea zeylanica*, the only plant of the family *Campanulaceae* included in F.M.C. (page **160**), in having blue flowers on slender pedicels in leaf axils, and not yellowish-green flowers in spikes.

Ebenaceae

Diospyros Ebenum, Koenig. (p. 20)

This plant differs from the two species of *Diospyros* described on page **164** F.M.C. as follows :—

From *D. chloroxylon* in not being thorny and in not having the underside of the leaves covered with brown hairs.

From *D. tomentosa* in not having seeds with ruminate albumen, and in having cymes of male flowers which are not densely tawny-tomentose.

Asclepiadaceae

Secamone ematica, R. Br. (p. 21)

Tylophora asthmatic, W. & A. (p. 22)

Both these asclepiads will trace down to 9 in the key on page **174** F.M.C. The following supplementary key will help to distinguish between these two plants and those following 9 in the key :—

1	Corona corolline	Gymnema sylvestre
	Corona staminal	2
2	Leaves lanceolate, small ; cymes short, rusty-pubescent	Secamone emetica
	Leaves broadly ovate	3
3	Follicles woody, blunt-tipped, up to 1 inch broad at base ; leaves up to 6 × 4 inches, glandular near the petiole	Marsdenia volubilis
	Not having these characters	4
4	Leaves less than 1 inch long ; cymes umbellate ; peduncles very short	Pentatropis micro-phylla
	Leaves more than 1 inch long, cymes branching or with long peduncles	5
5	Leaves cordate or obtuse at base, narrowed to apex ; cymes not rusty-villous	Tylophora asthmatica
	Leaves rounded or sub-acute at base, cuspidately acuminate at apex ; cymes rusty-villous.	Toxocarpus Kleinii

Gentianaceae

Hoppea dichotoma, Willd. (p. 23)

This plant leads to 3 in the key to the *Gentianaceae* on page **182** F.M.C. It differs from *Enicostemma littorale* in having inconspicuous, slightly irregular flowers in shortly peduncled cymes and ovate leaves not exceeding ·25 inch long; and from *Canscora sessiliflora* in having subentire stigmas and very short corolla lobes.

Boraginaceae

Trichodesma zeylanicum, R. Br. (p. 23)

This plant can be distinguished from the two species of *Trichodesma* described on page **185** F.M.C. by its much larger size, and by its calyx lobes which are rounded at the base and not lobed.

Scrophulariaceae

Limnophila racemosa, Benth. (p. 24)

Limnophila polystachya, Benth. (p. 25)

The following key may be used to distinguish between these two species of *Limnophila* and the one described on page **208** F.M.C. :—

1	Flowers in terminal or axillary, often branched, spikes	polystachya
	Flowers pedicelled	2
2	Stems up to 2 feet long ; corolla ·5 in. long or more	racemosa
	Stems up to about 8 inches long ; corolla ·3 in. long or less	gratioloides

Ilysanthes hyssopioides, Benth. (p. 25)

Ilysanthes serrata, Urban. (p. 25)

In place of the key on pages **209** and **210** F.M.C., the following may be used for distinguishing the species of *Ilysanthes* :—

1	Leaves with 1-5 ribs from the base ; capsules ovoid or subglobose ...	2
	Leaves penninerved ; capsules linear	4
2	Plant under 3 inches high ; leaves ovate, under ·25 in. long ; corolla blue	minima
	Plant 4-6 inches high	3
3	Corolla ·25 inch long or less, white or cream-coloured	parviflora
	Corolla about ·5 inch long, blue ; leaves linear or narrowly oblong ...	hyssopioides
4	Leaves deeply and closely serrate, the teeth spine-pointed	serrata
	Leaves shallowly and obtusely serrate	5
5	Stems prostrate below and rooting at the nodes ; leaves up to ·4 inch broad	veronicaefolia
	Stems erect from the base ; leaves up to 1 inch long by ·15 inch broad.	oppositifolia

Striga orobanchioides, Benth. (p. 26)

This plant differs from the species of *Striga* described on page **207** F.M.C. in having a 4-ribbed calyx, a pinkish corolla and red fleshy leaves and stem.

Centranthera humifusa, Wall. (p. 27)

This plant traces down to *Moniera* in the key to the genera of *Scrophulariaceae* on page **205** F.M.C. The genus *Centranthera* may be distinguished from *Moniera* by the spathaceous calyx split down the front, plants of the latter genus having 5-partite calyces with unequal lobes.

Lentibulariaceae

Utricularia caerulea, Linn. (p. 28)

Utricularia caerulea, Linn. var. **filicaulis** C. B. C. (p. 28)

Utricularia Wallichiana, Wt. (p. 28)

Utricularia stricticaulis, Stapf (p. 29)

The following key may be used to distinguish between these four plants and the one described on page **211** F.M.C. :—

1	A floating water-plant	flexuosa
	Marsh plants with erect stems rooted in the ground	2
2	Scales and bracts of the scape attached by their middles ; capsules globose	3
	Scales and bracts of scape attached by their bases ; capsules flattened	4
3	Corolla purple	caerulea
	Corolla white ; a very minute plant	caerulea var filicaulis
4	Scape very slender, twining ; corolla yellow	Wallichiana
	Scape relatively stout, not twining ; corolla purple	stricticaulis

Bignoniaceae

Dolichandrone falcata, Seem. (p. 30)

This plant may be distinguished from *Millingtonia hortensis* by its stamens which have both anther cells perfect, and by its much shorter corolla tube. It is distinguished from the other species of *Bignoniaceae* described on page **212** F.M.C. by its white corolla and its curved pod-like capsule.

Acanthaceae

Cardanthera balsamica, C.B.C. (p. 31)

The genus *Cardanthera* differs from the genera of *Acanthaceae* in the key on pages **214** and **215** F.M.C. in that the seeds are attached to small supports which are not hooked.

Stenosiphonium Russellianum, Nees var **subsericeum** T. And. (p. 32)

This variety is characterized by smaller leaves with white silky undersurface.

Andrographis elongata, T. And. (p. 32)

This plant differs from the two species of *Andrographis* described on page **220** F.M.C. in its straggling habit, and in its leaves which are broad, rounded at the base and then decurrent.

Barleria longiflora, Linn. (p. 32)

This plant can be distinguished from the species of *Barleria* described on page **220** F.M.C. and from others occurring in S. India by its white corolla with extremely long tube, its laige characteristic outer calyx lobes and its small velvety leaves.

Verbenaceae

Vitex altissima, R. Br. (p. 33)

This plant can be readily distinguished from the two species of *Vitex* described on page **228,** F.M.C., which have leaflets which are thin and white-tomentose on the undersurface ; in this plant the leaflets are thick and rather leathery in texture and the undersurface is not white ; in the variety *Alata,* the broad wing along the petiole is very characteristic.

Labiatae

Anisochilus eriocephalus, Benth. (p. 34)

This plant traces down to 6 in the key for the genera of *Labiatae* on pages **231** and **232** F.M.C. The genus *Anisochilus* differs from *Anisomeles* and *Leucas* in that the flowers are in dense usually long-peduncled spikes and not in axillary whorls.

Leucas biflora, R. Br. (p. 34)

This plant differs from the three species of *Leucas* described on page **236** F.M.C. in having the mouth of the calyx straight, and from these and from *L. hirta* in having only two flowers at a node.

Loranthaceae

Loranthus longiflorus, Desv. (p. 35)

This plant is very characteristic, being the only plant found in this area which is attached parasitically to the branches of trees and is itself a shrubby plant with large leaves. In the key at the beginning of F.M.C. this genus is found on page **14** under *Apetalae* but it would probably be looked for under *Sympetalae* as it appears to have distinct sepals and petals and the latter are united.

Moraceae

Ficus tomentosa, Roxb. (p. 35)

This plant is distinguished from the other species of *Ficus* described on pages **272** and **273**, F.M.C., by its buff-coloured or pale-brown densely tomentose receptacles, and by the glossy glandular patch at the base of the midrib on the underside of the otherwise tomentose leaf.

MONOCOTYLEDONS

Taccaceae

Tacca pinnatifida, Forst. (p. 36)

In the key to the genera of the Monocotyledons on page **17**, F.M.C., this plant traces down to 12, *Amaryllidaceae.* It differs from all species of *Amaryllidaceae* found in this area in having very large compound leaves. The leaf is very similar to that of *Amorphophallus sylvaticus* but can be distinguished from it by its hollow petiole and non-succulent texture.

Dioscoreaceae

Dioscorea oppositifolia, Linn, var. **Linnaei,** P. & B. (p. 37)

This plant and the species of *Dioscorea* described on page **286**, F.M.C., can be distinguished as follows :—

Stems twining to the left ; leaflets 3 to 5	pentaphylla
Stems twining to the right ; leaves simple	oppositifolia

Commelinaceae

Cyanotis tuberosa, Schult, f. (p. 38)

Cyanotis papilionacea, Schult, f. (p. 39)

These species may be distinguished from those described on pages **291** and **292**, F.M.C., by the following key :—

1	Cymes enclosed in the leaf sheaths	axillaris
	Cymes not enclosed in the leaf sheaths	2
2	Valves of capsule separating from a free central axis on dehiscence ...	papilionacea
	Capsule without a central axis after dehiscence	3
3	Stems and leaves cottony or silky-cobwebby	fasciculata
	Stems and leaves not cottony or silky-cobwebby	4
4	Bracts much longer than the cymes ; leaves narrowly elliptic, glabrous on both surfaces ; roots fibrous	cristata
	Bracts shorter than the cymes ; leaves linear, covered with long hairs below ; roots tuberous	tuberosa

Commelina undulata, R. Br., var, **setosa,** C.B.C. (p. 39)

The following key for the species of *Commelina* may be used in place of that found on pages **292** and **293** F.M.C.—

1	All 3 cells of capsule one-seeded	undulata var setosa
	Two cells of capsule 2-seeded	2
2	Capsule 2-celled ; spathes lanceolate, lobed at the base	attenuata
	Capsules 3-celled	3
3	Spathes funnel-shaped ; leaves ovate or sub-orbicular	benghalensis
	Spathes folded along the mid-rib, margins not joined at base ; leaves narrow.	4
4	Spathes sessile ; seeds grooved	subulata
	Spathes peduncled ; seeds not grooved	nudiflora

Many of the plants of this genus are very variable and their identification is not easy. It is necessary to examine a number of capsules and find the maximum number of cells and seeds, as in some specimens, owing to incomplete fertilization, less than the characteristic number may develop. Several other species of *Commelina* are reported from eastern parts of the Presidency and it is possible that further search may show that they occur near Madras City.

Palmaceae

Phoenix farinifera, Roxb. (p. 40)

This plant can be distinguished from the species of *Phoenix* described on page **295**, F.M.C., as follows :—

Leaflets with a conspicuous yellow or orange pulvinus at the attachment to the rachis, lowest leaflets reduced to flat spines	farinifera
Leaflets not or only slightly pulvinate, lowest leaflets reduced to channelled spines	humilis var. pedunculata

Araceae

Theriophonum minutum, Engl. (p. 41)

Theriophonum Wightii, Schott (p. 42)

In the key to the genera of *Araceae* on page **298**, F.M.C., these plants trace down to *Colocasia*. The South Indian species of *Theriophonum* differ from *Colocasia* in being much smaller plants and in not having peltate leaves. *Theriophonum* differs from *Typhonium*, to which it is nearly allied, in having numerous ovules in the ovary. The two species of *Theriophonum*, if they are distinct, can be distinguished by their leaves as follows :—

Lobes of leaves linear or very narrow	Wightii
Lobes of leaves broadly triangular or rounded	minutum

Amorphophallus sylvaticus, Kunth (p. 43)

This plant can be distinguished from the species described on page **299**, F.M.C., as follows :—

Peduncle long and slender ; spathes about 1 inch wide	sylvaticus
Peduncle short and very stout ; spathes up to 10 inches wide ...	campanulatus

DESCRIPTIONS OF FAMILIES, GENERA AND SPECIES

Portulaca Wightiana, Wall.

A small, semi-prostrate, succulent, probably perennial herb. Stems much branched; thick, up to about 3 inches long, sending down slender red, wiry roots from several nodes; nodes close together, with a ring of persisting lanceolate, acuminate, white scales at each; sections of stems between nodes like inverted truncated cones; lower part of stem cylindrical, red, scaleless. Leaves lanceolate or ovate-lanceolate, sessile, acute, up to ·3 inch long, opposite, very thick and turgid, upper surface strongly convex, under surface flat or concave, green with whitish markings. Flowers solitary, terminal, sessile, surrounded by four leaves and almost hidden by a ring of numerous narrow white scales, inconspicuous till fully open, ·25 inch across when open. Sepals 2, ovate, blunt-tipped, greenish-yellow. Corolla yellow; petals 4, 2 opposite the sepals and 2 between them, all broadly ovate, the former usually notched at apex. Stamens 5 to 8; anthers orange-yellow; pollen grains spherical ·05 mm. across, surface smooth and apparently sticky. Ovary spherical, glossy, pale green; style shorter than the filaments; stigma orange-yellow, divided into 4 to 6 elongated diverging lobes, closely studded with elongated gland-like bodies. Capsule one-celled, top half falling off on ripening. Seeds numerous, kidney-shaped, about ·4 × ·5 mm., reddish-brown, surface covered with small rounded bosses in longitudinal lines.

Growing gregariously in bare sandy patches in scrub-jungle at Tambaram (College Compound). The soil in this area is alkaline and marshy during part of the year. Under dry conditions, only the scale-covered stems are seen, the leaves being shrunken, yellowish or tinged with red and smaller than the scales. Plants found in this condition in February and March, on being watered produced green leaves, flowers and ripe capsules in a few days. A number of plants were found in flower in March and April. The flowers open only for a short time during the hottest part of the day, about 1-30 to 2-30 p.m. The tips of the leaves appear to be attached by a joint and it is possible that what appear to be leaves are actually leaf petioles functioning as leaves.

Grewia rotundifolia, Juss.

A large shrub or small tree branching from near the base. Bark smooth, ashy, with fine longitudinal corky cracks and transverse depressions about an inch apart. Leaves alternate, in two rows, broadly ovate or sub-orbicular, up to about 2·5 × 2 inches, base sub-cordate, upper side usually more deeply lobed than the other, apex rounded or with a very obscure tip, margin obscurely and irregularly serrate, both surfaces velvety, undersurface grey especially in old leaves, 5 prominent and one obscure nerve from the base; petiole up

to about ·2 inch ; stipules oblong, slightly auricled on one side at base, ·25 inch long, soon falling. Flowers in umbel-like, 3-flowered cymes in leaf-axils ; peduncles up to about 1 inch long, 1, 2 or 3 at each axil, slender, with minute tufts of hairs ; pedicels up to about ·4 inch ; bracteoles very small, di- or trifid. Sepals oblong, ·4 inch long, acute, light yellow, pubescent. Petals with a broad, densely hairy thickened greenish base and small yellow limb. Stamens with bright yellow filaments and bright yellow rounded anthers. Ovary densely hairy ; style about twice as long as the filaments ; stigma of two greenish lobes with fringed margins. Drupes slightly 2-lobed, greyish, softly hairy.

A common plant in scrub jungle. Tambaram (College Compound). The leaves fall in April and the branches become covered with tufts of bright yellow flowers, the plant then presenting a striking appearance. The fruit ripens a few months later.

Crotalaria biflora, Linn.

A small annual herb. Stem up to about 5 inches long, trailing on the ground, villous. Leaves simple, ovate, rounded at the base, rounded or bluntly pointed at the apex, most not exceeding ·5 inch long, bluish-green, both surfaces clothed with scattered long white hairs; petioles very short ; stipules absent. Flowers in 1- or 2-flowered leaf-opposed racemes. Peduncles up to about ·8 inch long. Bracts and bracteoles filiform. Calyx lobes green, bearing long white hairs, 3 narrowly lanceolate, 2 broadly lanceolate and joined for about half their length. Corolla yellow, about ·35 inch long ; standard with fine brown radiating lines. Pod sub-globose, ·4 × ·35 inch, slightly flattened and with an obscure groove on each side, thinly covered with longish white hairs. Seeds about 20 to each capsule, kidney-shaped, about ·15 inch long.

Growing in open ground at Tambaram (College Compound), not frequent. Flowers in January and sets seed in February.

Sesbania procumbens, W. & A.

An annual herb. Stems several, up to about 3 feet long, straight, radiating from the root and resting on the ground, not rooting at the nodes, elliptical in cross-section, somewhat ridged, bearing scattered obtuse prickles. Leaves alternate, abruptly pinnate, up to about 3·5 inches long, with up to about 30 pairs of leaflets ; bracts ovate, acute, scarious, with a green rib ; leaflets oblong, 0·25 inch × 0·06 inch, bases unequal, upper surface glaucous, margins brownish-red ; rachis white along the middle. Flowers solitary or in pairs on very short pedicels in leaf axils, 0·25 inch long. Calyx with short triangular teeth. Corolla yellow ; standard without appendages and with dark purple spots on the back. Pods straight, elliptical in cross-section, constricted externally and with a partition between the seeds, acute at apex, up to about 4 inches long, containing up to about 25 seeds. Seeds shortly cylindrical 0·1 inch long, pale greenish-brown, without strophiole but with a prominent micropyle.

Tambaram (College Compound) in open ground, not common. Flowers and sets seeds at most parts of the year.

Atylosia, W. & A.

Herbs or shrubs, erect or twining. Leaves pinnately or rarely digitately 3-foliate ; leaflets with resinous glands beneath ; stipules lanceolate or setaceous ; stipels small or o. Flowers usually yellow, axillary, in pairs or racemes ; bracts usually broad, membranous, deciduous ; bracteoles o. Calyx-tube campanulate, the lobes distinct, the lowest the longest, the two upper joined together in an entire or bifid lip. Corolla more or less exserted, sometimes remaining attached after withering ; standard orbicular, auricled at base ; wings obliquely obovate or oblong ; keel slightly curved, obtuse. Stamens in two groups ; anthers uniform. Ovary sessile, ovules 3 or more ; style filiform, incurved, glabrous; stigma capitate. Pod linear or oblong, septate within, the valves more or less transversely or obliquely depressed between the seeds. Seeds ovate or orbicular, with a conspicuous strophiole.

Atylosia scarabaeoides, Benth.

An annual herb with a deep tap root, climbing by twining to the right, or trailing over the ground, sometimes erect at first. Stems wiry, round, red or greenish-red, pubescent, much branched from near the base. Leaves with three leaflets, all 3-nerved from the base and with a network of veins prominent below, margins raised on the underside, both surfaces grey-green, tomentose but not glandular ; end leaflet longest, ovate or obovate, tip rounded or slightly retuse, up to ·8 inch long, petiolule about ·15 inch ; side leaflets ovate, lower half slightly larger than the upper half, apex slightly retuse, with a short petiolule and a hairy pulvinus. Flowers one or two, on very short peduncles in leaf axils. Calyx with 4 lanceolate hairy lobes. Standard yellow with red veins on the back ; wings yellow ; keel greenish-yellow. Stamens 9 and 1. Ovary with long silky hairs ; style glabrous ; stigma small, terminal. Pod ·8 to ·9 inch long and ·25 inch broad, with straight depressions outside and septa within between the seeds, usually with 5 seeds, sometimes 4 or 3, dark-brown, with long yellowish silky hairs. Seeds with a grooved caruncle.

A very common plant at Tambaram in scrub jungle and grassy places. Flowers during the greater part of the year except the hottest months. Not previously recorded from the Carnatic.

Rhynchosia rufescens, DC.

Plate. I-A

A large herbaceous plant with wiry branches up to 8 feet long. Stems straggling over large bushes and twining at their upper ends, round, red where exposed to the sun, green below, finely glandular-pubescent. Leaves with 3 almost equal leaflets pinnately arranged,

about 3·5 inches long including petiole ; leaflets ovate, about 1·5 inch × 1 inch, side ones unequal-sided, finely glandular-pubescent, prominently net-veined below, margins entire, tips blunt or sub-acute, smelling of geranium when crushed. Flowers in slender racemes in the axils of leaves ; pedicels about ·1 inch ; racemes about 5- to 7-flowered, flowers of a raceme opening at long intervals so that the lowest have ripened and scattered the seeds while the upper are still in small bud. Calyx almost concealing the flower ; lobes ovate, upper two joined for about ⅓ to ½ of their length, not enlarging on fruiting, truncate or slightly cordate at the base, tips bluntly mucronate, margins and veins reddish, glandular-pubescent. Standard broad, ·3 × ·25 inch, bright yellow with a red patch near the middle, streaked with red on the back ; keel greenish-yellow. Pod ·4 inch long, ovoid, flattened, shortly beaked and with an open slit below the beak, dull chocolate-brown, pubescent, one-seeded, the two valves curled inwards after dehiscing. Seed dark olive-green to black, glossy, with a blackish caruncle.

On Unamalai and Vandalur Hills. Flowers and sets seeds in January.

Rhynchosia suaveolens, DC.

Plate. I-B

A sticky unpleasant-smelling undershrub, erect till about 2 feet high and then climbing by twining. Stems round, pale green, up to 1 inch across ; branches wiry. Leaves having 3 leaflets pinnately arranged, up to 6 inches long including the petiole, covered with fine sticky glandular hairs ; leaflets ovate, shortly acuminate, up to about 2·5 × 2 inches, light green, 2 side ones with lower sides about twice as large as the upper sides. Peduncles axillary, slender, 1- or 2-flowered. Bracts and bracteoles small, narrowly lanceolate, soon falling. Flowers ·4 inch long. Calyx lobes lanceolate, not accrescent, 2 upper joined for more than ½ their length. Standard yellow, with 2 small white auricles near the base ; wings yellow, spurred near the base ; keel greenish. Stamens 9 and 1. Pods 2-seeded, about ·75 inch × ·4 inch, flattened, bluntly beaked, compressed between the seeds and with a slightly oblique septum dividing the pod into two cells, light brown, pubescent. Seeds dull black, smooth, with a light brownish caruncle.

Tambaram (College Compound), Vandalur. Flowers and sets seed in January.

Rhynchosia cana, DC.

An erect non-aromatic undershrub with few branches. Main stem about ·25 inch across, dark red, with longitudinal cracks ; branches round, somewhat ridged, red on one side and green on the other, pubescent, not twining at their ends. Leaves with three leaflets, up to about 2·5 × 2 inches, net veined, pubescent on both surfaces, hairs of young leaves glandular but not sticky ; mid-leaflet broadly ovate, blunt tipped ; side leaflets

irregularly ovate, the lower half much broader than the upper ; rachis channelled, with two small red gland-like stipels at the attachment of the mid-leaflet and one at the attachment of each of the side leaflets. Peduncles short, 2-flowered, in the axils of leaves. Calyx lobes lanceolate, lowest slightly longest, two upper joined for $\frac{2}{3}$ of their length, hairy, green and dark red. Standard broad, bright yellow with a small brownish-red patch near centre and red veining on the back ; wings narrow, yellow ; keel very pale green, upper $\frac{1}{3}$ joined. Stamens 9 and 1. Pod 2-seeded, about ·5 inch long, inflated, slightly constricted between the seeds, somewhat obliquely truncate at the end and with a small slit at the end when ripe, green mottled red, becoming light brown, glabrous. Seed glabrous, dull brown speckled lighter and darker, with a black caruncle.

A common plant in scrub jungle at Tambaram (College Compound). Flowers and sets seeds January and February.

Pterocarpus, Linn.

Trees. Leaves alternate, imparipinnate ; leaflets alternate, usually leathery ; stipules small, deciduous ; stipels 0. Flowers yellowish, in terminal or axillary racemes or panicles; bracts small, deciduous ; bracteoles 2, soon falling. Calyx tube campanulate, somewhat curved ; teeth short, the 2 upper often partly joined. Corolla exserted, the petals all long-clawed ; standard orbicular, crisped at the margin ; wings oblique, the margins also crisped ; keel-petals oblique, smaller, slightly connected. Stamens 10, the filaments joined in a tube split above, sometimes split in 2 bundles of 5, sometimes the one opposite the standard free ; anthers uniform. Ovary sessile or stalked ; ovules 2 to 6 ; style filiform, incurved, beardless ; stigma capitate. Pod orbicular, compressed, with a broad wing, the style turned down towards the stipe. Seeds 1, rarely 2, oblong or more or less kidney-shaped ; hilum small.

Pterocarpus Marsupium, Roxb. The Gum-kino Tree.

Plate I-C

A medium-sized tree as found in this district. Bark brownish grey to dark grey, with vertical cracks. Leaves compound with 3 to 5 leaflets ; leaflets irregularly distributed along a round rachus and resembling simple leaves on a branchlet, broadly oblong-ovate, up to about 4 × 1·6 inches, base rounded or bluntly wedge-shaped, apex truncate and emarginate or bilobed, margin entire, leathery, with numerous straight veins pinnately arranged along a central rib ; petiolule thickened, curved, ·25 inch long. Flowers in simple racemes in leaf axils and in terminal panicles, yellow. Pod orbicular, with a broad wavy wing all round, up to about 1·75 inches across, style persisting as a point about 1/8 of the circumference from the stipe, stipe about ·2 inch long, margin convex between style and stipe. Seeds 1 or 2, embedded in a hard fibrous core, flattened, about ·4 inch long.

Common between the Vandalur and Vengambakkam Hills. The pods are found on the trees for most of the year. Flowers not seen.

Mimosa rubicaulis, Lamk.

A large very prickly straggling shrub. Branchlets red, roughly 5-sided, with 5 rows of curved thorns. Thorns about ·12 inch long. Leaves bipinnate, about 6-inches long; pinnae 5 pairs or fewer; leaflets up to 11 pairs per pinna; rachis armed with thorns. Leaflets glabrous, oblong, up to about ·6 × ·35 inch, attached to the very short petiolule at a corner, with the main nerve running parallel to and about ¼ of the width of the leaflet from the upper edge. Stipules filiform, pointed and stiff but not modified to thorns. Flowers sessile, in globose heads, a few scattered on the peduncle, sweet-scented. Peduncles about 1 inch long, solitary in the axils of the leaves. Petals 4, ovate, red on inner surface, joined to form a white tube below. Stamens about 8; filaments ·35 inch long, deep pink; anthers very small. Pods curved, thin, with a line of thorns on the inner suture only, containing up to 9 seeds but usually fewer, red, dilated round each seed, tip blunt or shortly acute, very shortly stalked. On ripening the pod breaks into more or less square pieces each containing one seed, the marginal sutures remaining attached to the plant. Seeds circular, flattened, ·2 inch across, pale brown, with a horseshoe-shaped line on each face.

At the foot of the hills at Vandalur and Vengambakkam, forming dense thickets. Flowers and fruits from December to February.

Halorrhagidaceae

Herbs, often aquatic. Leaves opposite or whorled, sometimes partly alternate, when submerged often reduced to threads; stipules 0. Flowers hermaphrodite or unisexual, small, axillary, solitary or fascicled, sessile or pedicelled. Calyx-tube joined to the ovary, lobes usually 4. Petals 4, sometimes 2 or 0, valvate or slightly imbricate. Stamens 8, 4 or 1; anthers 2-celled, dehiscing longitudinally and laterally. Ovary 4-, 2- or 1-celled; ovules 4, pendulous; styles as many as cells; stigmas papillose or plumose. Fruit small, dry or drupaceous, 4-, 2- or 1-celled, indehiscent or separating into carpels. Seeds pendulous, 4 or rarely 1.

Myriophyllum, Linn.

Glabrous aquatic herbs with floating stems. Leaves opposite or whorled, the floating ones usually linear-serrate, the submerged ones modified to branched threads. Flowers very small, hermaphrodite or male and female separate but on the same plant, axillary or in nearly naked spikes; male very shortly pedicelled or sessile, female sessile. Calyx in

male minute, 4 rarely 2-lobed, sometimes 0 ; in female adnate to the ovary, 4-furrowed, lobes 0 or 4, minute. Petals in male 2 or 4, concave, sessile ; in female usually 0. Stamens 2, 4 or 8. Ovary of 4, rarely 2, carpels ; ovules solitary, pendulous ; styles short, plumose. Fruit 4-furrowed, separating into 4 or 2 cocci ; embryo straight or curved.

Myriophyllum indicum, Willd.

An annual water-plant with floating stems. Stems slender, round, glabrous, several feet long, the lower end rooted in the mud, the upper end floating on the surface of the water, freely branching at the upper end. Leaves whorled, whorls numerous ; submerged leaves consisting of pinnately branched filaments, the branching alternate, the branches curved ; floating leaves green, lanceolate, very narrow at the base, ·5 inch long or shorter, margins with a few slender serrations, in passing down the stem the leaves become narrower and the serrations more numerous and longer. Flowers hermaphrodite, 4 or 5 at a node in leaf-axils, sessile. Calyx lobes 4, minute, triangular, green. Corolla lobes 4, about ·07 inch long, ovate, pink, soon falling. Stamens 8 ; anthers large, oblong. Ovary inferior, 4-lobed, tubercled, 4-carpelled, with one ovule in each carpel ; styles 4, short, spreading. Fruit separating into 4 one-seeded parts.

Very plentiful in a tank in the Vengambakkam Hills. Flowers in February.

Anogeissus, Wall.

Trees or shrubs. Leaves alternate or subopposite, petioled, entire. Flowers in dense globose heads on short axillary peduncles or in short cymes ; bracts on the peduncles or at the cyme branches, often leafy ; bracteoles minute. Calyx-tube slender above the ovary ; limb cup-shaped with 5 lobes. Petals 0. Stamens 10, in 2 series ; anthers small. Ovary inferior, 1-celled ; ovules 2, pendulous ; style subulate. Fruits packed in dense heads, compressed, 2-winged, ending in the persistent calyx-tube and sometimes limb. Seed 1 ; cotyledons rolled up.

Anogeissus latifolia, Wall.

Plate II-A

A medium-sized tree. Bark thin, smooth, light brownish-grey with irregular lighter patches caused by exfoliation. Branchlets grey, with a thin stringy skin often frayed. Leaves sub-opposite or opposite, broadly ovate, straight at base, blunt or flattened at the apex, the two sides often partly folded together, leathery, glabrous on both surfaces, up to about 4 inches long and 2·6 inches broad, becoming red, or yellow with red patches, before falling ; midrib yellow, with numerous curved, not very conspicuous, nerves and a net-work of finer veins ; petiole bright red, about ·4 inch long. Flowers in small heads on

short peduncles in leaf axils and in cymes at the ends of branches. Fruits closely packed in heads, somewhat flattened, 2-winged with a straight beak, first yellow, then brown, about ·15 inch across, up to about 16 to a head.

Vengambakkam Hills. Flowers about December. Fruits February and March.

Passiflora suberosa, L. (*P. minima* L.).

A climber with stems up to about 6 feet long. Lower parts of stems with a whitish corky covering with wide longitudinal yellowish-brown fissures ; upper stems slender, glabrous. Tendrils closely coiled, axillary. Leaves shallowly palmately 3-lobed, middle lobe largest, tips of all lobes abruptly acute, up to 4 inches long by 3·25 inches broad ; petiole up to about ·5 inch, with two round purplish glands near its attachment to the blade ; stipules filiform, curved, purplish. Flowers about ·75 inch across, 1 or 2 in leaf axils, or in pairs not at axils but often at the ends of branches. Peduncles and pedicels slender. Bracteoles very small, filiform, soon falling. Calyx lobes narrow, greenish. Petals absent. Corona of 3 rings ; outer of narrow spreading greenish teeth purplish at the base ; middle of short knobbed filaments ; inner of flattened processes joined to each other (these processes are crested with a mat of short hairs that hold the pollen shed from above and so aid in its distribution). Fruit blue-black, ovoid, glabrous, about ·6 inch long. Seeds pear-shaped, surface pitted.

A plant originating in South America and found running wild in Madras gardens. The fruits are much sought after by birds, who doubtless are responsible for the plant's distribution.

Oldenlandia caerulea, Gamble

An annual, erect or semi-prostrate herb. Stems very slender, wiry, red, with short stiff hairs. Leaves linear, sessile, up to about ·6 inch long, apex bristle-pointed, upper surface glossy but scabrid, margins turned back, undersurface pale and usually with two parallel veins standing out ; stipules scarious, truncate and with 4 to 6 long bristles and some much shorter ones. Flowers sessile, solitary in axils and in terminal 2- or 3-flowered heads, about ·1 inch long. Calyx lobes 4, acutely triangular, bristle-pointed. Corolla pale blue. Capsule globose, scarbid.

In open ground at Tambaram (College Compound), not frequent. Flowers in January and sets seed in February.

Randia uliginosa, DC.

A small tree. Branches curved and with numerous short branchlets which usually bear groups of 3 or 4 short stout spines at their ends. Bark of trunk brownish-grey, with large warty outgrowths ; bark of branchlets brown, coming off in thin flakes. Leaves mostly in groups of 4 or 5 near the ends of the branchlets, some arranged oppositely,

oblanceolate to ovate, base narrowed, apex rounded, almost sessile, glabrous on both surfaces, glossy above, with about 6 pairs of pinnately arranged nerves, up to about 6 × 3 inches, usually smaller. Flowers solitary at the ends of branchlets, 1·5 inches across, white, scented. Corolla-lobes 5, 6 or 7, spreading. Filaments very short; anthers linear. Fruit a fleshy berry up to about 1·8 × 1·5 inches, end hollow, yellow when ripe, 2-celled. Seeds numerous, embedded in sweet-smelling pulp, ovoid, flattened, ·15 inch long, brown, glossy.

In the higher parts of the bed of a tank between Vandalur and Nedunkundram. Flowers in July. Ripe fruit found in July and March. In this tank-bed there is a large patch of this plant growing as a low, almost procumbent shrub which flowers at the same time as the tree but does not appear to produce fruit.

Coffea, Linn.

Shrubs. Leaves opposite or ternate; stipules broad, interpetiolar. Flowers in axillary fascicles or cymes or solitary: bracteoles joined into a single or double calyx-like ring, often glandular. Calyx tube short; teeth 4 or 5, short, or numerous and irregular, often glandular within. Corolla-tube short or long; lobes 4 or 5, spreading, twisted in the bud. Stamens 4 or 5; filaments short or 0; anthers linear, attached to the throat of the corolla-tube. Ovary 2-celled; ovules one in each cell, peltate on the septum; style slender, bifid at apex; the lobes linear. Fruit a small drupe with 2 plano-convex cartilaginous or bony pyrenes. Seeds concave or grooved on the inner side, the testa membranous.

Coffea Wightiana, W. & A.

A shrub up to about 8 feet high but usually much smaller. Main stem upright, slender, branches mostly at right-angles to main stem, branchlets at about 45° to branches. Stiff pointed stipules at the ends of branchlets make the plant semi-thorny. Bark smooth, very pale yellowish-grey, with fine longitudinal cracks. Leaves opposite, lanceolate to ovate, almost sessile, blunt to sub-acute at apex, acute or acuminate at base, glabrous except at the base where they are pubescent, not usually exceeding 1 inch in length, turning yellow before falling. Interpetiolar stipules shallowly triangular, apex long, stiff and curved outwards, margins with stiff hairs. Flowers solitary at the ends of branchlets. Calyx tube very short, green, with 5 teeth each consisting of 3 red gland-like processes. Corolla white, jasmine-scented, up to 1·1 inch across; tube up to ·75 inch long; lobes spreading, twisted to the right in the bud, the tips not meeting. Stamens 5, in the corolla tube. Style long, cleft at the end. Fruit a small drupe containing two woody pyrenes.

Common at Vandalur and Tambaram (College compound) in scrub jungle. This plant appears to flower more than once a year, but remains in flower only a day or so. It is almost leafless when in flower but is then covered with white flowers and is a striking and

beautiful plant ; at other times it is very inconspicuous. As with cultivated coffee, all plants appear to flower together. Seen in flower during the third week of March and again during the third week of June the same year.

Epaltes pygmaea, DC.

Plate II-B

A small branching prostrate or semi-prostrate herb. Stems green, with three shallowly and irregularly toothed wings. Leaves sessile, narrowly oblong-spatulate, rather thick, glabrous, up to about ·75 inch long, often not more than ·25 inch. Margins crenate, midrib obscure, nerves invisible. Flower-heads single in leaf axils, ·15 inch across or less, spherical in bud, thistle-shaped when in flower, broader than long when in seed ; peduncle slender, about ·25 inch long. Bracts of involucre in several series, acute, glabrous, centre green, margins scaly and colourless or red. Female flowers in several series on the outside, opening before the bisexual flowers ; calyx tube very slender, with 2 or 3 narrow teeth ; style bifid, just emerging from the calyx tube. Bisexual flowers occupying the whole of the centre of the infloresence ; corolla tube funnel-shaped, 4- or 5-lobed, pink ; style extending far above the mouth of the corolla tube, stigma studded with clear, colourless, elongated, apparently sticky processes ; anthers joined and forming a mauve tube round the base of the style. Pollen grains white, spherical, echinate. Achenes black, glossy not ridged, ·4 to ·5 m.m. long.

Common on grassy maidans near Tambaram. Also found at San Thome. Flowers and sets seed in January and February.

Gnaphalium, Linn.

Hoary or woolly herbs. Leaves alternate, entire. Heads heterogamous, small, not rayed, in terminal or axillary corymbs or fascicles ; outer flowers female, fertile, very many, in 2 to many rows, corollas filiform 3- or 4-toothed, style-arms slender truncate or capitate ; inner flowers hermaphrodite, fertile, few, corollas tubular, shortly 5-lobed, anther-bases with slender tails. Bracts of involucre many, imbricate, all more or less scarious. Receptacles naked or pitted. Achenes small, oblong or obovoid, often minutely scaly ; pappus hairs in one series, more or less joined at the base, soon falling.

Gnaphalium indicum, Linn.

A small erect annual herb about 4 inches high, usually branched from the base. Stems densely covered with white wool. Leaves alternate, linear-spatulate, up to about 1 inch long, greyish-green, woolly. Flowers in terminal spikes about 1 inch long. Heads about ·125 inch long, thistle-shaped, yellowish, woolly. Bracts of involucre strap-shaped, scarious,

yellow with a green centre. Receptacle green. Flowers not rayed, mostly female, a few in the centre male and female. Hairs of the pappus in one series. Achenes light brown, covered with white scales, about ·3 m.m. long.

Common on the drying beds of tanks near Vandalur and Tambaram, at the foot of the hills. Flowers in January and February. The drying plant has a pleasant aroma.

Lobelia, Linn.

Small herbs or tall undershrubs. Leaves alternate, usually toothed. Flowers on axillary 1-flowered peduncles ; bracts leafy ; bracteoles small or 0. Calyx superior, 5-toothed. Corolla oblique, 2-lipped, the upper 2-partite, the lower 3-lobed. Staminal-tube free or nearly so ; anthers joined, 2 or all tufted at apex. Ovary 2-celled ; stigma shortly bifid. Fruit a loculicidally 2-valved capsule. Seeds very many, minute, ellipsoidal, compressed or trigonous.

Lobelia trigona, Roxb.

A small marsh herb up to 1 foot high but usually only a few inches high in this district. Stems succulent, 3-sided and narrowly 3-winged. Leaves alternate, cordate or roundly deltoid, base flat and then narrowed, almost sessile, with 2 pairs of nerves from near the base, glabrous on both surfaces, up to about ·5 inch long and broad. Flowers solitary in the axils of leaves on slender square pedicels up to about ·5 inch long. Calyx superior with 5 lanceolate spreading lobes. Corolla 2-lipped ; tube cylindrical, splitting along the back ; lower lip of 3 ovate lobes with raised claw-like areas in the two sinuses between them, raised areas white, the surface of the lobes pale blue, violet round the raised areas ; upper lip 2-lobed, lobes ovate, curled back, white. Stamens 4 ; filaments free ; anthers joined, black, with a silvery brush-like appendage on each, standing outside the corolla tube at the back in the later stage of the flower. Ovary 2-celled ; style as long as the stamens ; stigma spherical. Capsules ovoid bearing the persisting calyx lobes. Seeds numerous, ovoid, triangular in cross-section, brown, glabrous, ·5 m.m. long.

In rice fields near Tambaram. Flowers and sets seed from January to March.

Diospyros Ebenum, Koenig. The Ebony Tree.

Plate II-C

A small tree, the branches with a drooping habit ; branchlets green, round, glabrous. Bark thin, brownish-grey, with longitudinal cracks. Plants male or female. Leaves alternate, narrowly ovate, up to about 4·5 × 1·75 inches, tip rounded, the two sides somewhat folded together, leathery, margins entire and wavy, both surfaces glabrous, bright green, young leaves yellowish-green drying black ; nerves rather obscure, secondary veins arching together irregularly, finer veins reticulate. Flowers sweet-scented. Male flowers mostly in 3-flowered cymes on short peduncles in leaf axils. Calyx cup-shaped,

with 4 small glabrous rounded lobes, tips minutely apiculate, margins very finely ciliate. Corolla white, ·5 inch across ; tube broad, tapering to the mouth, ·25 — ·4 inch long ; lobes 4, ovate, overlapping to the right. Stamens 16 ; filaments branched and each bearing 2 anthers at 2 levels ; anthers 2-celled with a straight beak at the tip. Ovary infertile, flattened, shallowly 8-lobed. Female flowers solitary in leaf axils, pedicels ·1 inch long. Bracts 2, small, ovate, with scattered silky hairs, soon falling. Calyx lobes 4, ovate-triangular, spreading, forming a square with hollow sides, thick, minutely pubescent. Corolla white, ·7 inch across ; tube ovoid ; lobes 4, ovate-triangular, overlapping to the right, tips curved back. Staminodes 8, flattened, attached at the base of the ovary, each in a recess in the corolla tube. Ovary ovoid, narrowed to a stout style which is cleft near the apex into 4 spreading somewhat concave stigmatic lobes. Fruit globose, slightly broader than long, ·6 to ·75 in across, the calyx forming a shallow woody cup at the base the lobes being reflexed, 6- to 8-seeded. Seeds shaped like the section of an orange, up to about ·5 inch long, with a median line along the curved surface, light chocolate-brown, surface smooth and waxy, albumen uniform.

Fairly common on the Tambaram and Vengambakkam Hills. Flowers in February and March ; fruit ripens in August. The Flowers turn cream-coloured on fading and become black when dry or when preserved in formalin.

Secamone, R. Br.

Climbing or straggling shrubs or undershrubs. Leaves opposite. Flowers small or minute, in lax axillary sessile or shortly peduncled 2- or 3-chotomous cymes. Calyx 5-lobed, eglandular. Corolla small, rotate, 5-lobed, the lobes overlapping to right or left ; corona-scales 5, joined to the staminal column, compressed. Stamens inserted at the base of the corolla ; filaments short, free or joined at base ; anther-tips inflexed and connivent round the style-apex ; pollen-masses small, in pairs in each cell, attached in fours to a minute pollen-carrier without caudicles. Ovary of 2 carpels, many-ovuled ; style columnar, dilated, ending in a flattened ring and produced above it. Fruit of 2 diverging smooth follicular mericarps. Seeds oblong, flattened but ridged, ending in a long white silky coma.

Secamone emetica, R. Br.

An extensively climbing plant with wiry stems twining to the right ; nodes abruptly and much enlarged when giving rise to branches. Leaves opposite, lanceolate, occasionally linear, sub-acute at apex and base, 2 × ·65 inches, glabrous on both surfaces ; midrib depressed on upper surface, raised below ; nerves straight, obscure ; petiole about ·15 inch. Flowers in short cymes in leaf axils. Bracteoles broadly ovate, acute ; peduncles and

pedicels rusty-pubescent; sepals rounded; corolla glabrous, about ·2 inch across, lobes, oblong, obtuse, with saccate bases, bright yellow; coronal scales narrow, laterally flattened, incurved, much shorter than the column; stigma 2-lobed. Follicles widely diverging, straight, 3·5 inches long, ·2 inch wide gradually tapering, outer surface rounded, inner flat, glabrous, slightly ridged longitudinally, dehiscing by splitting along a line along the middle of the flat surface. Seeds few, brown, boat-shaped, about ·4 inch long, bearing at one end a diverging brush of silky hairs about 1·5 inches long.

Common on the Vandalur and Vengambakkam Hills climbing over bushes. Found in flower in August. South Indian specimens of this plant in flower in Kew Herbarium were collected in May, July, August and November. Ripe follicles found in April.

Tylophora, R. Br.

Erect or twining perennial herbs or under shrubs. Leaves opposite. Flowers small, in axillary or lateral simple or branched umbelliform cymes of flower-clusters or short racemes scattered along them. Calyx 5-partite, glandular within; lobes ovate or lanceolate. Corolla rotate or rotate-campanulate, deeply 5-lobed, the lobes slightly over-lapping to the right; corona of 5 small fleshy tubercular processes joined to the lower part of the staminal-column. Staminal-column arising from the base of the corolla; anthers erect, small, with small inflexed membranous appendages; pollen-masses minute, usually horizontal, attached by their middle or near their base by very slender usually short caudicles to the pollen-carriers. Ovary of 2 carpels; style apex pentagonal or 5-lobed, flattened or convex, rarely exserted. Fruit of 2 (or, by abortion 1) follicular mericarps, smooth, usually acuminate. Seeds flattened, ovoid, margined, ending in silky coma; cotyledons elliptic; radicle cylindric.

Tylophora asthmatica, Wt. & Arn.

A climbing slender-stemmed plant. Stems round, softly hairy. Leaves variable in shape and hairiness, usually ovate, oblong or rounded, base usually cordate, apex acute or acuminate, up to about 2·5 × 1·5 inches, glabrous or pubescent; petiole about ·5 inch long. Peduncles in leaf axils, usually shorter than the leaves, cymously branched and bearing 2 or 3 umbels of flowers, pubescent; pedicels slender, about 1 inch long. Flowers ·25 inch across; sepals long-lanceolate, hispid; corolla with large shortly acute lobes, dull yellow, purple within; coronal processes gibbous or globose with cuspidate tips. Follicles diverging, round in cross-section, acuminate, up to about 3 inches long, smooth, glabrous. Seeds broadly ovate, ·3 inch across, with a white silky pappus about 1·5 inches long.

Common in all East Coast districts in hedges and thickets. Madras City, Poonamallee.

Hoppea, Willd.

Small, much-branched glabrous herbs. Leaves opposite, small, sessile. Flowers sessils or short-pedicelled, in 2- or 3-chotomous cymes, small. Calyx campanulate, membranous ; lobes 5, lanceolate. Corolla tubular ; lobes 4, more or less unequal. Stamens inserted in the throat of the corolla, 1 perfect, 3 barren or wanting ; filament linear, short ; anther ovate, with parallel cells. Ovary 1-celled, placentas little intruded ; style short, stigma 2-lobed. Fruit a globose or ellipsoid capsule, septicidally 2-valved. Seeds very many, minute, obscurely reticulate.

Hoppea dichotoma, Willd.

Plate III-D

A small erect much-branched herb, usually 2 to 3 inches high or less. Stem square, slightly winged at the angles. Leaves opposite, sessile, ovate, acute, glabrous, about ·25 inch long. Flowers almost sessile, in dichasial cymes. Calyx lobes 4, lanceolate, with a green thickening or rib along each margin, apex acute, ·1 inch long. Corolla narrowly bell-shaped with 4 triangular outward-pointing teeth, about as long as the calyx, greenish-yellow. Stamens inserted on corolla tube, only one developed. Capsule elipsoidal, opening at the top by four valves that curl outwards. Seeds irregularly spherical, almost black, glossy, with rounded tubercles, ·25 m.m. across.

In moist grassy places near Tambaram. Appears and flowers in February and March when conditions have begun to get dry.

Tricodesma zeylanicum, R. Br.

A hispid annual herb growing up to 5 feet high. Stems green, round, with small spine-like hairs on raised red bases. Leaves opposite and alternate, narrowly ovate, sub-acute at apex, narrowed at the base, up to 7 × 2·3 inches, harsh with small stiff hairs ; veins curved, depressed on upper surface, prominently raised below ; petiole up to about ·25 inch, absent in upper leaves. Flowers numerous, in drooping paniculate cymes at the end of branchlets. Pedicels up to 1 inch long, with long silky hairs. Calyx lobes ovate-lanceolate, base rounded, apex acute, with long silky hairs on the back, glabrous inside, ·5 inch long, enlarging in fruit. Corolla ·5 inch across, lobes broadly obovate, apex acuminate and spirally twisted, without glands, pale blue with pink patches between the lobes. Stamens joined to form a slender cone, with silky hairs on the back, the ends drawn out to long ribbon-like twisted tails. Ovary glabrous ; style long, slender. Nutlets smooth, black and glossy on outer surface, brown and rough on inner surface, triangular, about ·15 inch across.

On dry open land. Tambaram (College Compound.) Flowers and sets seed in January. The sharp hairs of the stem break off in the skin and are irritating.

Limnophila racemosa, Benth.

Plate III-B

An annual water plant having an aromatic smell. Roots white. Stem narrow near the root, then for a foot or so resting on the mud at the bottom of the water and becoming thick and reddish and bearing whorls of filiform leaves, and then becoming erect and green and rising about a foot above the surface of the water and bearing lanceolate leaves and flowers. Flowers arranged in long racemes ; on the lower part of the raceme there are 3 flowers and 3 cordate bracts at a node, on passing upwards the flowers become less exactly opposite and the bracts smaller, on the upper part the flowers are arranged spirally. Pedicels about ·25 inch long. Calyx of 5 equal lanceolate lobes joined for a little more than half their length, covered with fine gland-tipped hairs. Corolla nearly ·75 inch long, about ·5 inch wide at the mouth ; tube narrowly funnel-shaped, slightly dilated near the base, then slightly flattened and somewhat curved, yellow, with fine purple longitudinal veins on the upper side ; lower lip of 2 roundish lobes fused together, very pale mauve with a violet patch near the centre of each lobe, with a dense patch of hairs at the base and scattered hairs elsewhere ; upper lip 3-lobed, middle lobe cordate, side lobes roundish or bluntly triangular, very pale mauve, with scattered hairs. Stamens 4, 2 longer and 2 shorter, the lower half of the filaments attached to the corolla tube, anthers of each pair joined together. Ovary bright green, spherical, tapering above ; style single, white or greenish, glabrous, ·25 inch long ; stigma spatula-shaped, turned at right angles to the style. Capsule broadly egg-shaped, splitting into 4 valves. Seeds numerous, bluntly wedge-shaped, dark-brown, about 0·5 m.m. long.

The transition from filamentous leaves below water to lanceolate ones above water is interesting. At intervals along the thickened horizontal part of the stem below water there are whorls of about 20 brown filamentous leaves up to about 1½ inch long consisting of a main thread from which a number of branches emerge and these side-branches are themselves branched towards their ends. On the lower part of the upright portion of the stem the filamentous leaves become more numerous (30) and shorter. A little higher up, the leaves, while remaining filamentous, become shorter and thicker and are green near the stem and brown at the tips. A little below the surface of the water, the filaments become fewer and are flattened and simply branched and stand out stiffly round the stem. At about the surface there are 3 sessile lanceolate leaves with toothed margins, the teeth being sometimes branched, between the 3 leaves there are a few flattened filamentous leaves. Above water there are 3 sessile lanceolate leaves at each node ; the lower of these leaves have divided or rounded tips and the upper ones acute tips ; they have each about 5 parallel nerves. The filamentous submerged leaves are obviously homologous with the nerves of the upper leaves.

Common in pools along the Chingleput Road between Tambaram and Vandalur. Flowers and seeds in January.

Limnophila polystachya, Benth.

Plate III-A

An annual aromatic marsh plant. Stems white, pale green or pinkish, dark red at the nodes, usually erect, sometimes the lower portion resting horizontally on the mud. Leaves varying from whorls of branched filaments to sessile lanceolate green leaves three at a node as in *L. racemosa* (see above) ; aerial leaves finely serrate. Flowers in spikes at the end of the stem and in the upper axils. Calyx lobes narrowly ovate, acute, glabrous. Corolla ·4 inch long, white or pale pink with pale purple veins ; upper lip of three ovate-triangular lobes ; lower lip of a broad slightly bifid lobe ; tube funnel-shaped with long hairs in the throat. Stigma spoon-shaped, bent. Capsule splitting into 4 valves. Seeds reddish-brown, bluntly wedge-shaped, about ·25 m.m. long.

Growing plentifully at Puttur near Tambaram in drying tank beds and in rice fields. Flowers from the end of January till early March.

Ilysanthes hyssopioides, Benth.

A slender marsh herb rarely attaining 6 inches in height. Stems square, winged at the angles, unbranched or branching only from the base. Leaves linear, lower ones occasionally lanceolate, under ·5 inch long. Flowers solitary in leaf axils, usually only one flower from each node. Pedicels thread-like, up to about 1·1 inch long, deflexed when in fruit. Calyx lobes lanceolate, about ·1 inch long. Corolla 2-lipped, ·5 inch long, pale blue ; tube broad, compressed, narrowly funnel-shaped ; lobes spreading, semicircular or ovate. Stamens 2 perfect with short filaments and united anthers, standing at about the middle of the tube ; 2 staminodes having long hairy filaments joined to the corolla tube for their whole length, and club-shaped, hooked, yellow upper ends at the mouth of the corolla tube. Style about as long as the corolla tube ; stigma spherical. Capsule ovoid, about ·15 inch long. Seeds numerous, yellowish-brown.

Common in marshy places round Madras, Tambaram, Red Hills. Flowers January till March. This plant is widely distributed, and is found in both East and West Coast districts and up to high elevations on the hills.

Ilysanthes serrata, Urban

A small annual herb. Stems numerous from the base, spreading and erect, up to about 2·5 inches long, square, grooved on two sides, not rooting at the nodes. Leaves opposite, ovate or ovate-oblong, up to 1·2 inches long and ·45 inch broad, sessile, rounded or somewhat narrowed at the base, apex rounded, margins deeply and closely serrate, the teeth bristle-pointed, glabrous on both surfaces, veins obscure. Flowers in lax terminal racemes. Bracts linear with acute tips. Pedicels short and thick. Calyx lobes long,

narrow, tips very acute. Corolla tube very slender, ·2 inch long; lower lip with three broad rounded lobes, ·2 inch wide, white with deep pink blotches; upper lip oblong, narrow, notched. Stamens 2 fertile; 2 reduced to curved linear pink and white staminodes attached to the lower lip of the corolla by a claw. Capsule narrow, cylindrical, ·3 inch long, 2-celled, 2-valved. Seeds very numerous, black, surface covered with round pits, about ·4 m.m. across.

Growing in moist places in open ground at Tambaram (College compound). Flowers and sets seed in January.

It is found growing in association with Vandellia crustacea, Benth. and Osbeckia zeylanica, Willd.

Striga orobanchoides, Benth.

An erect, somewhat fleshy, parasitic plant. Stems round, widened below each node, up to about 6 inches high in local specimens, dark red, glabrous, slightly warty as seen by a lens, base below ground nodular giving out a few wiry roots. Leaves opposite or sub-opposite, up to about ·25 inch long, ovate or bluntly triangular, thick and fleshy, pressed against the stem, red, with a few stiff white hairs near the tip. Spikes up to about 40-flowered. Bracts similar to leaves but usually more acute at the tip, shorter than the calyces. Bractioles much narrower. Calyx ·25 inch long, square in cross-section, with 4 thick triangular lobes, the fifth lobe reduced to a scale at the back sinus. Corolla ·3 inch wide; upper lip broad, obscurely 2-lobed, pink, becoming white and densely hairy in the throat; lower lip divided into 3 ovate lobes, pink becoming white at the base; tube ·3 inch long, lower half yellow and glabrous, upper half pinkish, hairy, somewhat dilated and curved. Stamens 4; anthers narrow, black; filaments attached to the corolla tube. Seeds roughly oblong, about ·3 × ·12 m.m., brown, with longitudinal slightly spirally-twisted ridges.

In dry rocky places. Lower parts of Vandalur Hill, Nanmangalam Hill and Tambaram (College compound).

Flowers in January. Several specimens examined were found to be parasitic by their roots on *Lepidagathis cristata*, Willd.

Sopubia delphinifolia, G. Don

Fyson in his Flora of the South Indian Hill Stations, page 432, states that this plant is a root parasite but gives no further information. This plant grows in marshy ground near Tambaram. A number of plants growing amongst grass were dug up with as much earth as possible. On washing away the earth several were found to have their roots attached parasitically to the roots of a grass which has been kindly identified by Mr. Fischer as *Chrysopogon montanus*, Trin.

Centranthera, R. Br.

Scabrid herbs, probably more or less parasitic. Leaves opposite or the upper alternate, entire or toothed. Flowers axillary or in bracteate spikes or racemes ; bracteoles 2. Calyx spathaceous, split on one side, compressed, entire or shortly 3 to 5-lobed. Corolla-tube long, tubular or funnel-shaped, incurved and dilated above ; limb oblique ; lobes subequal, spreading, the 2 upper inside in bud. Stamens 4, didynamous, included ; anthers meeting in pairs, cells transverse, spurred or mucronate at base ; one cell often imperfect. Ovary with many ovules ; style simple, dilated above ; stigma tongue-shaped, acute. Fruit an ovoid or sub-globose loculicidal capsule ; valves entire, the placentas in the middle. Seeds very many, conical or wedge-shaped ; testa lax, reticulate.

Centranthera humifusa, Wall.

Plate III-C

A small marsh herb. Roots reddish-orange. Stems up to about 4 inches, erect or prostrate, branched near the base, green or red, grooved on two opposite sides, the grooves being above the leaves. Leaves sub-opposite alternate, linear, sessile, under 1 inch long, entire, glabrous, rough. Flowers solitary in leaf axils, sessile. Calyx spathaceous, ovoid, with a backwards-pointing tip, 0·2 inch long, green becoming reddish on the upper half, somewhat tubercular-hispid. Corolla narrowly funnel-shaped, slightly curved at base, with 5 almost equal rounded lobes, ·6 inch long, tube brownish-red within, lobes yellow. Stamens 4, attached to the base of the corolla tube, 2 slightly longer than the other 2 ; filaments flattened, upper ends curved, the longer with long yellow hairs covering the whole of one side from the attachment upwards, the shorter with a tuft of hairs on one side above the middle ; anthers white with a pointed spur. Ovary ovoid, bright green ; style long, curved ; stigma spatulate. Capsule ovoid, splitting into 4 valves. Seeds numerous, bluntly conical, yellowish-brown, surface reticulate.

Growing in marshy ground at Puttur and Vandalur and other places near Tambaram. Flowers in December and January.

This plant has previously been reported from the East Coast (Tada), but it is more frequently found on the West Coast. In the Flora of Madras Presidency the filaments are described as glabrous. This is not the case with specimens found in this area.

Utricularia caerulea, Linn.

A very slender annual plant of moist places. Leaves about ·25 inch long ; blades green, spatulate. Bladders with wide mouths and long slender beaks. Scapes up to 7 inches long, usually shorter, slender, erect, purplish or green. Scales of the scape and bracts

attached by their middles, both halves narrow and acuminate. Flowers sessile or with very short pedicels, about ·25 inch long. Sepals 2, round, concave, pale brownish-purple. Upper lip of corolla small, erect, ovate, indented at the upper end, uniformly purple ; lower lip broadly ovate-triangular, convex, purple, with a raised palate ; palate with a yellow patch at the mouth from which four white parallel ridges run out and then turn down at right-angles forming a step ; spur much longer than the lower lip, slenderly conical, standing more or less at right-angles to the scape, the tip curving upwards. Capsule spherical. Seeds minute, yellow, surface furrowed or obscurely reticulate.

Common on moist ground round the margins of ponds and in rice fields near Tambaram. Flowering December to February. This does not appear to have been previously reported from the Carnatic.

* **Utricularia caerulea** Linn. var **filicaulis**, C. B. Clarke.

A minute plant. Leaves numerous, ·25 inch long ; blade green, spatulate, ·12 inch long ; petiole white. Bladders very small, with wide beaked mouths. Scapes single, erect, very slender, up to about 3 inches long, sometimes branched, round, green becoming dark purplish near the base, up to 6-flowered, but usually with only 2 or 3. Scales and bracts of the scape attached by the middle, acute at each end. Flowers almost sessile, ·2 inch long, only one opening at a time. Calyx lobes 2, broadly ovate or circular, concave, mucronate, reddish-purple. Corolla 2-lipped, white or very pale yellow ; upper lip small, oblong ; lower lip inflated with a turned-up margin, having a yellow patch at the mouth ; spur narrowly conical, slightly curved, pointing outwards at right-angles to the scape. Capsule globose. Seeds numerous ovoid, 0·15 × 0·2 m.m. brown, glossy, longitudinally grooved.

Common in the neighbourhood of Tambaram on the margins of ponds, in rice fields and in moist places amongst grass. Flowers and seeds in January and February.

Utricularia Wallichiana, Wt.

Plate III E

A very small annual marsh plant. Leaves about ·25 inch long ; blade narrowly spatulate, green ; petiole white. Bladders round with a wide mouth and a longish pointed beak. Scapes very slender, irregular, erect or twining to the right, round, darkish-green, up to 3·5 inches long, often not more than 1 inch. Scales of scape and bracts attached by

* Since correction of the last proof, information has been received from Prof. F. E. Lloyd (McGill University) that this plant may prove to be distinct from *U. caerulea* Linn., and that a superficially similar plant also from Tambaram is probably a new species. This name and the key should therefore be regarded as liable to alteration.

their bases, narrow, very acute at apex, light green or brownish. Pedicels about ·06 inch long. Sepals 2, very acute at apex, truncate at base, brownish- or greenish-yellow. Upper lip of corolla small, triangular obtuse, yellow ; lower lip circular, with a raised bluntly conical centre, uniformly yellow ; spur longer than the lower sepal, slender, curved, flattened, pale yellow. Capsule flattened. Seeds ovoid, bluntly pointed at each end, obscurely furrowed longitudinally, about ·2 × ·13 m.m., yellowish-brown.

Common on moist ground on the maidan to the east of the College site at Tambaram and in the shade of bushes at the foot of Vandalur Hill. Flowers December till February. This plant is well known on the hills of S. India where the scape attains a length of a foot or more, but it has not previously been reported from low levels on the East Coast.

Utricularia stricticaulis, Stapf

Plate III D

A small annual marsh plant. Leaves very narrow, up to about ·5 inch long, the blades resting on the mud. Scapes single, relatively stout, cylindrical, smooth, bright green, narrowed and reddish at the base, up to 5·5 inches long, bearing up to 9 flowers. Scales of scape attached by the base, short, acute, pale green. Bracts fixed by the base, one broad and two narrow at the base of each pedicel. Pedicels flattened, about ·25 inch long. Sepals broadly ovate, acute at both ends, pale green. Corolla about ·4 inch long ; upper lip broadly ovate, blue or bluish-purple, paler at the base and with numerous dark blue radiating striations ; lower lip hemispherical with a large raised palate or cushion, bluish purple with darker markings on the palate ; spur longer than the lower sepal, narrowly conical, flattened, slightly curved, the tip pointing downwards or slightly outwards. Capsule lenticular. Seeds almond-shaped, ·26 × ·13 m.m. brown, with obscure longitudinal furrows.

This appears to be by far the commonest Utricularia found near Madras. Common on borders of ponds and in rice fields near Tambaram. Grows in striking profusion in shallow ponds near the seashore between Elliot's Beach and Tiruvanmiur. Flowers from December to March. The flowers have a scent suggestive of violets.

Dolichandrone, Fenzl.

Trees. Leaves opposite, pinnate, the leaflets entire or obscurely toothed. Flowers few, opening at night, usually white, large or moderate-sized, in terminal corymbs or panicles. Calyx spathaceous, cleft to the base on one side. Corolla-tube long or short ; lobes 5, nearly equal, crisped on the margin. Stamens 4, in two unequal pairs, included ; anthers glabrous, the cells parallel. Disk annular. Ovarysessile ; ovules numerous, many-seriate ;

style long ; stigma 2-lobed. Fruit a long subterete or compressed capsule, loculicidally 2-valved ; the septum narrow with a transverse false septum, making seemingly 4 cells. Seeds much compressed, almost rectangular, with broad wings on each side ; cotyledons usually broader than long, emarginate.

Dolichandrone falcata, Seem.

Plate IV A

A small tree branching from the base upwards. Bark light ashy-grey, smooth ; ends of twigs grey, furry. Cotyledon leaves having two orbicular lobes ; leaves of seedling simple, ovate, acute at apex, acuminate at base, bright green, glossy. Leaves of mature plant opposite, pinnately compound, with 7, 5 or 3 leaflets, about 3·5 × 1·5 inches ; side leaflets irregularly orbicular, sometimes broader than long, apex flattened or slightly indented, with short petiolules ; end leaflet much larger than side ones, orbicular or obovate, acuminate or straight or slightly cordate at base, petiolule about half as long as the leaflet ; rachis and both sides of leaflets finely tomentose and scurfy, greyish-green. Flowers usually one or two at the ends of branchlets, having a heavy sweet scent. Calyx spathaceous, pubescent, ·75 inch long. Corolla white, about 1·25 inches long, tube narrow, mouth trumpet-shaped, lobes crumpled. Stamens 4, in the corolla tube, anthers large. Style long ; stigma 2-lobed. Fruit a capsule resembling a pod, sickle-shaped, with a spiral twist, up to about 20 inches long and ·75 inch wide, margin slightly wavy, 2-celled and with a median depression on both sides indicating the septum, parts exposed to the sun dark greenish- or brownish-red, shaded portions green, whole surface irregular and scurfy. Seeds in two rows in each cell, the rows separated by a thick layer which is first fleshy and then corky but with a glossy surface. Seeds oblong, flattened with an oblong wing at each end, 1 × ·7 c.m. ; envelope of seed corky ; wings scaly, ends irregularly frayed, up to 1·4 c.m. long.

Common in scrub jungle, usually in dry stream beds and sandy places. Tambaram (College compound), Vandalur, Selaiyur Reserve. Flowers during July and August. The capsule ripens slowly and remains on the tree for some months after shedding the seeds, and so that immature or dehisced capsules are to be found on the tree throughout the year.

Cardanthera, Buch.-Ham.

Aromatic, often viscid herbs. Leaves opposite, the upper toothed, rarely entire, the lower often pinnatifid, or if submerged, pectinate. Flowers in spikes or axillary whorls or 1–3 in the leaf-axils ; bracts and bracteoles foliaceous, but often suppressed. Calyx 5-partite, the lobes narrow, often unequal. Corolla-tube straight ; limb 2-lipped, the upper erect, 2-lobed, the lower 3-lobed with a transversely plaited palate. Stamens 4, in

unequal pairs, anthers of the posterior pair often smaller, cells parallel. Ovary narrow, 2-celled ; ovules many ; style slender ; stigma linear, bent. Fruit a narrow 2-celled capsule, many-seeded throughout. Seeds very many, small, ovoid ; retinacula minute, conical, straight.

Cardanthera balsamica, C. B. Clarke

An erect branching annual herb with an aromatic smell. Roots white, numerous from the condensed base of the stem. Stem round near the base, with a dense centre and a spongy outer zone, square and slightly ridged on opposite sides above, up to 2 ft. high. Leaves opposite, lanceolate or oblong-lanceolate, sessile, shallowly serrate-crenate, lower leaves often pinnately dissected into narrow branched segments, glabrous but with a pubescent or hairy patch on the upper side at the base, upper surface somewhat sticky, up to 3 inches long. Flowers in axillary whorls, usually 2 at each node open at the same time, about ·5 inch long. Calyx funnel-shaped with 4 lanceolate lobes and an upper ovate lobe ; tube white, pubescent ; lobes green, glabrous. Corolla 2-lipped, pale blue to pink ; tube funnel-shaped ; upper lip bluntly triangular with 2 small overlapping lobes at the tip, having two grooves on the back ; lower lip broad, convex, obscurely 3-lobed, with a palate covered with a network of purple or violet depressed veins, with scattered hairs. Stamens 4, 2 longer and with larger anthers than the other 2. Ovary green, elongated, pubescent ; style filiform, pubescent, with a linear stigmatic surface on one side near the bent tip. Capsules narrow, 2-celled, pale brown, pubescent, ·25 inch long, opening explosively and scattering the seeds. Retinacula short, bluntly conical, ocassionally inclined to the septum but not hooked. Seeds numerous, ovoid, reddish-brown, ·4 to ·5 m.m. long, hygroscopically hairy.

Very common in drying rice fields and tanks. Puttur, Tambaram, Poonamallee. Flowers in February and March. Capsules ripen in March. This plant is able to produce normal-sized flowers when very small. Large areas of drying tank beds and rice fields are often covered with plants from less than one inch to a few inches high but flowering freely. When the flower first opens the tip of the style is pressed back against the upper lip of the corolla and the anthers are held a little forward so that an insect coming to the mouth of the corolla is likely to get dusted with pollen. At a later stage the filaments curl and draw the anthers down into the tube and the style curves down a little so that the stigmatic surface is likely to come into contact with an entering insect. This arrangement ensures cross-fertilization.

This plant is in many respects very similar to *Hygrophila angustifolia,* R.Br. Diagram B on Plate XXXI of the Flora of Madras City is almost certainly of *Cardanthera balsamica* and not *H. angustifolia.* The latter is not recorded as occurring in the Carnatic. The two

plants may be distinguished by their bracts; in *H. angustifolia* the bracts are long-acute at the apex and the upper margins bear stiff bristle-like hairs ; in *C. balsamica* the tips are blunt or sub-acute and the margins are without prominent hairs.

Stenosiphonium Russellianum, Nees, var. **subsericeum,** T. And.

This variety differs from the species in being a low straggling woody plant usually with small leaves which are white-silky on the under surface. The older leaves are silky or glabrous below. The seeds are more or less heart-shaped, brown, with a dull glabrous surface except for a roundish sticky-looking patch on each side ; on moistening with water they become surrounded with long silky hairs ; on again drying the hairs become firmly attached to the surface on which the seed rests, and so the seed is anchored.

Common on the Tambaram Hills. Flowers in March.

Andrographis elongata, T. And.

Plate IV-B

A straggling herb. Stems wiry, square, narrowly winged at the four angles, dark green, practically glabrous, nodes widely separated, twisted through about a right angle between each two nodes. Leaves ovate, apex blunt, base acuminate, up to about 3 inches long, sessile, margin entire, both surfaces glabrous, green or reddish. Flowers in rather distant-flowered racemes in leaf axils and at the ends of branches, the lower racemes with several branches. Bracteoles subulate, short. Pedicels about ·125 inch. Calyx lobes lanceolate, covered with gland-tipped hairs. Corolla obscurely two-lipped, glandular-hairy outside ; 2 side lobes of upper lip pale yellowish-green spotted with pale crimson ; mid-lobe of upper lip and two lobes of lower lip white or pale pink with scattered pale crimson spots. Filaments glabrous ; anthers reddish-purple. Style glabrous, upper end purplish, pointed. Capsule about ·8 inch long, finely glandular-hairy, acute at tip, about 8-seeded. Seeds dull brown, like chipped arrow heads, about 1·75 m.m. long.

Common straggling amongst undergrowth in the neighbourhood of Tambaram. Puttur, Mullumalai, Vandalur. Flowers in February and March, and sets seeds in March and April. In the Flora of Madras Presidency this plant is reported only from evergreen forests of the Tinnevelly hills.

Barleria longiflora, Linn. f.

Plate IV-C

A small unarmed much-branched shrub. Branches round, straight, finely tomentose. Leaves narrowly to broadly ovate, acute, or sub-acute at apex, up to 1·6 × 1·4 inches usually smaller, softly velvety on both surfaces with very fine glandular hairs, light greenish-grey, midrib and main nerves standing out below ; petiole up to about 1 inch.

Flowers scattered along the upper branches singly in leaf axils or on few-flowered cymose branches. Bracts linear, acute, glandular-tomentose, about ·75 inch long. Two outer calyx lobes pressed together, broadly ovate, truncate or sub-cordate at the base, very pale green with a prominent dark-green network of veins, becoming pale brown and scarious in fruit, ·9 × ·65 inches ; two inner calyx lobes small, narrow, surrounding the base of the corolla tube. Corolla white, 4 inches long or longer, 1·6 inches wide ; tube slender, tapering slightly from base to about ·5 inch below the mouth and then becoming narrowly funnel-shaped, with 5 spreading broadly ovate lobes, the 2 lower slightly smaller than the other 3, tube and backs of lobes finely hairy. Stamens 4, 2 with small but fertile anthers standing near the base of the funnel-shaped part of the corolla tube and with only about ·1 inch of their filaments free, 2 with large anthers standing about ·25 inch above the mouth of the tube, the filaments of the short stamens hairy and the filaments of the long stamens covered with long hairs at the level of the short stamens. Ovary green, narrowly ovoid ; disc clasping the lower half of ovary and having an irregular margin ; style about 3·75 inches long, threadlike ; stigma very small, truncate. Capusle, ·6 inch long, compressed ; retinacula acute, upward-pointing. Seeds flattened, cordate, reddish-brown, with long white silky appressed hairs which on moistening with water become erected.

Common on Vandalur and Vengambakkam hills growing amongst rocks at elevations of 300 feet and above. Flowers and sets seeds November to February.

Vitex altissima, Linn. f.

A small to moderate-sized tree in this area ; branchlets square ; bark smooth, grey. Leaves opposite, with three leaflets, aromatic when crushed ; leaflets lanceolate to narrowly ovate, apex acuminate, base acute, almost sessile, slighty pubescent especially on the veins ; petiole slightly winged at the base, channeled above. Flowers in cymose panicles at the ends of branchlets, ·2 in. long ; calyx funnel-shaped, cream-coloured, pubescent ; corolla pubescent, pale blue, lip violet, yellow in throat ; anthers black : apparently only one flower on each cymose branch develops to a fruit. Fruit a drupe about ·3 inch across, dark purple with obscure white spots ; pulp purple ; pyrene bony, spherical, blackish, with obscure longitudinal grooves, 4-celled.

Vandalur at the foot of the hills, Pachaimalai. Flowers in August. Fruit ripens in January. Under favourable conditions this tree grows to a large size and yields a useful timber.

Vitex altissima, Linn. f. var. **alata.**

Plate IV-D.

A shrub or small tree in this area. Leaves with three leaflets. Leaflets lanceolate to narrowly ovate, sessile, acuminate at both ends, nerves numerous and curved, up to 6 × 2 inches ; petiole up to 4 inches long, broadly winged especially in young plants ; wing rounded at the upper end and auricled at the base, up to about ·9 inch wide.

Frequently found in scrub jungle at Tambaram (College compound) but it has not yet been seen in flower. This variety is described as differing from the type only in the broadly winged petiole.

Anisochilus, Wall.

Herbs or undershrubs, often fleshy. Leaves opposite or whorled. Flowers small, in dense tetragonal or cylindrical or slender whorled spikes, the floral leaves and bracts often early-dropping, red glands often covering especially the corollas. Calyx suberect, inflated below the middle, 2-lipped or 5-lobed, rarely 1-lipped, the upper lip often entire and much deflexed, the lower short, truncate or minutely lobed. Corolla 2-lipped, the tube slender below, inflated above and decurved ; upper lip entire or 3- or 4-lobed, lower elongate, concave. Stamens 4, in unequal pairs, curved forwards, filaments free. Disk lobed. Ovary 4-partite ; style bifid at apex. Fruit of four ovoid dry nutlets, basal scar small.

Anisochilus eriocephalus, Benth.

An erect herbaceous plant up to about 18 inches high. Stems thick, obscurely 4-sided. Leaves opposite, broadly ovate, obtuse, shallowly cordate at base, thick, very finely and softy glandular-hairy below, margin shallowly crenate, up to 1·3 × 1·5 inches ; petiole up to ·9 inch. Peduncles slender, red, very finely glandular pubescent, branched ; branches opposite and at right angles to the main peduncle. Spikes ovoid-conical, up to ·9 × ·45 inch. Upper lip of calyx hemispherical, acute at front, dark reddish-green, lower lip truncate, densely fringed round the mouth with long silky hairs. Corolla with a very slender tube which is bent and then enlarges to a compressed funnel-shaped mouth ; upper lip erect, obscurely 4-lobed ; lower lip boat-shaped horizontal ; the narrow part of the tube and the two lips violet, the funnel white. Stamens 4, 2 slightly longer than the other 2. Stigma slightly forked at the tip. Stigma and anthers in the boat-shaped lower lip of the corolla. Seeds 4, almost black, glossy, broadly ovoid, somewhat flattened on three sides, about 1 m.m. long.

On the side of Unamalai growing in crevices in rocks exposed to the sun. Flowers in January. The spikes have a bronzy lustre. Ripe seed found in March and April.

Leucas biflora, R. Br.

An herbaceous plant of variable habit growing in tufts amongst grass or straggling amongst shrubs or undergrowth. Stems up to 3 feet long, slender, green, square, hairy especially along the angles. Leaves 2 at a node, ovate, rounded or bluntly wedge-shaped at base, sub-acute at apex, coarsely crenate, softly hairy, nerves strongly raised on under side, under 1 inch long ; petiole only about ·12 inch. Flowers 2 at a node. Bracts short, linear.

Calyx ·25 inch long, narrowly companulate, 10-ribbed, mouth straight, teeth 10, acute, about ·1 inch long, ciliate. Corolla white ; lower lip broad, flat, with two spatulate side-lobes and a longer obscurely 4-lobed middle lobe ; upper lip narrow, convex, densely hairy externally and on the margin. Stamens 4, 2 slightly longer than the other 2, bent at upper end which is inside the upper corolla lip ; anthers small, scarlet. Style divided near the tip into two unequal pointed branches. Nutlets 4, 3-sided, bluntly wedge-shaped, about ·06 inch long.

Common at Tambaram, Vandalur and Puttur. Flowering throughout the cooler months of the year.

Loranthus longiflorus, Desv.

Plate V-A

A parasitic shrub. Branches woody, enlarged at the nodes, running along and parasitic on the branches of trees and large shrubs. Bark smooth, grey with numerous silvery grey branching lines. Branchlets round, smooth, green. Leaves opposite and subopposite, narrowly ovate, up to about 6 × 2 inches, with very short petioles, apex blunt, thick, leathery, yellowish-green, glabrous, mid-rib and irregularly branching veins standing out slightly on both surfaces. Flowers in many-flowered racemes in leaf axils. Pedicels ·2 inch long. Bract at base of calyx short, bluntly pointed. Calyx glabrous ; mouth straight, slightly spreading. Corolla about 2 inches long, glabrous ; tube yellow, pale orange or reddish, sometimes splitting for part of its length, lower half narrow and straight, upper half dilated and curved ; lobes 5, ·4 inch long, strap-shaped, acute at apex, curling inwards, outer surface green, a dark green ring at the base ; inner surface dark red or green below, light green above. Stamens 5 ; filaments short, attached at base of corolla lobes, pubescent ; anthers elongated, attached for their whole length on the same side of the flattened filament end, back of filament end red. Ovary one-celled, sunk in the calyx ; style thread-like, 2 inches long ; stigma small, spherical. Berries oviod-oblong.

Common in a restricted area on the Vengambakkam Hills to the south of Tambaram but not elsewhere in the district. Flowers in February and March. The plants seen were parasitic on *Mimusops hexandra*, Roxb., *Zizyphys Xylopyrus*, Willd. and *Grewia rotundifolia* Willd. Mr. Fischer, in Records of Botanical Survey of India Vol. XI, No. 1, mentions over 100 plants on which *L. longiflorous* is parasitic.

Ficus tomentosa, Roxb.

Plate V-B

A large tree with milky juice. Bark light grey, smooth, with narrow transverse ridges and small corky streaks, exfoliating in round patches about 1 inch across, the scars resulting from the exfoliation giving rise to horizontal depressions as the trunk

grows. Ends of twigs covered with yellowish-brown fur ; lower parts glabrous, dark reddish-brown, with longitudinal cracks and elongated corky patches. Leaves alternate ; blade up to about 7 × 4·5 inches, ovate or slightly obovate, base shallowly cordate, apex bluntly apiculate, upper surface glabrous except for curly hairs on and near the base of the midrib and main nerves ; under-surface densely tomentose with brownish-yellow hairs ; main nerves usually 5 or 6 pairs, straight, not opposite except the lowest pair which join the midrib at the base ; gland at the base of the midrib at the back consisting of a roundish, green, sticky-looking patch, sometimes hidden by a tuft of hairs ; petioles round, tomentose, up to about 2·75 inches long. Stipules lanceolate, densely hairy on the back, soon falling, ·7 inch long. Receptacles sessile, in pairs in leaf axils or at nodes without a leaf, densely tomentose, buff-coloured, 1 cm. across.

Growing between rocks, Tambaram and Vengambakkam Hills. Fruit ripening in March.

Taccacae

Perennial herbs ; rootstock tuberous or creeping. Leaves radical, entire and ribbed, or pinnately lobed or irregularly lobed and penninerved. Flowers 2-sexual, regular, umbelled on a naked scape with an involucre of 2-12 spathaceous bracts and long, filiform bracteoles. Perianth superior, urn-shaped or subcampanulate, 6-lobed in 2 series. Stamens 6, included, on the tube or the base of the perianth-lobes ; filaments very short, dilated or laterally appendaged at the base, dilated into a hood above the anthers with 2 ribs or horns on the inner face ; anther sessile within the hood. Ovary inferior, 1-celled ; ovules many on 3 parietal placentas ; style short, included ; stigmas 3, often petaloid, broad and 2-lobed, inflexed like an umbrella over the style. Fruit berry-like or at length 3-valved, 3- to 6-ribbed. Seeds numerous, ovoid, striate ; albumen hard ; embryo minute.

Tacca, Forst.

Characters of the Family, fruit a berry.

Tacca pinnatifida, Forst.

Plates V-C and VI-A

A perennial plant with white roundish tubers a few inches in diameter. Leaves radical, usually one from each tuber ; blade up to 2 feet in diameter, 3-partite; in young plants the 2 side lobes are each bilobed and the middle one remains undivided; in older plants each lobe is unequally divided into numerous lobes, some of the lobes being joined only by narrow strips along the ribs ; petioles up to 2 feet long cylindrical, tapering, ridged, hollow, green mottled with purplebelow. Scapes up to 37 inches, similar to the petioles, hollow. Inflorescence an umbel of 40—50 flowers ; bracts

6, light yellowish-green, 2 outermost larger, broad at the base and tapering to a point, 4 smaller 2 near each sinus between the larger ; bractioles thread-like up to 6 inches long, drooping ; flowers on lax pedicels up to about 1 inch long. Perianth superior, of 6 lobes alternately broader and narrower ; lobes boat-shaped with incurved tips, the tips of the three broader lobes folded one over the other and over these the tips of the three narrow ones are folded, outer surface yellow, wrinkled, inner surface white. Stamens 6 ; filaments joined to the perianth from the bottom, expanding to a white hood with out-turned edges at about the middle of the perianth lobes ; anther attached to the front edge of the hood ; pollen grains ovate, about 0·03 × 0·05 m.m. There are two liver-coloured keels, broader below than above, growing out of the lower half of each perianth lobe and running parallel to the filaments. Ovary one-celled ; ovules attached to the cell wall in 3 rows. Style purple, broadly conical and bearing gland-tipped hairs at the base. In the ripening fruit three rounded purplish elevations develop at the base of the style. These are covered with white gland-tipped hairs. Stigma white, consisting of 3 bilobed petal-like parts which spread round the style like an umbrella. Fruit a round yellow berry up to about 1 inch in diameter, with 3 large and 3 smaller ribs, tip carrying the persisting perianth, containing about 25 seeds. Seeds closely packed. Seeds ovoid, somewhat irregularly compressed, about 0·2 inch long, light brown, with about 15 longitudinal ridges.

Growing on shaded tank bunds near Puttur, 2 miles south of Tambaram. Leaves and flowers found in November, fruit in December. The distribution given in F.P.M. is Ganjam, Rampa Hill, Nallamalais and Mysore (Ananthapura). This plant is sometimes cultivated, apparently by hill tribes. Under cultivation the tuber is said to grow to 1 foot in diameter and the leaf to 3 feet in diameter. One of several products called East Indian arrowroot is obtained from the tuber.

The flowers of this peculiar plant do not appear to expand. It appears probable that cross fertilization is brought about by small flies that enter by the apertures between the perianth lobes. The internal structure of the flowers and their faint mushroom-like smell support this suggestion. The drooping thread-like bracteoles probably serve as settling places for the flies.

Dioscorea oppositifolia, Linn. var. **Linnaei** Pr. and Burk.

Plate VI-B

A slender climbing plant with a tuberous root. Tuber light brown, ovoid, with a narrow neck. Stems wiry, unarmed, round, twisted, twining to the right. Leaves changing with the age of the plant. First few leaves alternate, broadly cordate, about 2 × 2 inches, with two pairs of strongly-marked veins from the base of the mid-rib, darkish green mottled with lighter green and purplish ; petioles 1·5 inches, channelled, base clasping the stem, upper

part dilated. Leaves of mature plant lanceolate or narrowly ovate, slightly auricled at base, acute or somewhat acuminate at apex, one pair of prominent nerves arching from base to apex, light green becoming yellowish, leathery ; petioles 0·5 inch long, flattened, rather stout, twisted and used for climbing. Male flowers in spikes in leaf axils and fascicled at the ends of branches, sweet-scented, lowest spikes opening first ; rachis brown, pubescent ; bracts brown, scaly, mucronate ; perianth lobes 3 outer and 3 inner, broadly ovate, ·05 inch long, pale green ; stamens 6. Female flowers in few-flowered branched spikes in leaf axils, rachis pubescent ; ovary ovate, triangular in section, with 3 rounded ribs, ·25 inch long, light green, glossy, pubescent ; perianth superior yellowish-green, of 3 outer hemispherical and 3 less convex inner parts ; styles 3 ; staminodes 6, flattened, arranged at the corners and mid points of sides of an equilateral triangle. Capsule having 3 suborbicular wings, slightly depressed and with a blunt tip at the apex, ·6 inch long, 1 inch wide. Seeds discoid, with a membranous wing.

Very common round the base of Vandalur and Vengambakkam Hills, in thickets, climbing over shrubs. Flowers in December and January. Capsules ripen about March. The identification of this plant was kindly confirmed by Mr. I. H. Burkill, the authority on this family.

Cyanotis tuberosa, Schult, f.

Plate VII-A

A perennial herb. Roots tuberous ; tubers numerous from a thickened stock, longly spindle-shaped, surface reddish-brown, flesh cellular with a denser centre. Stems round, green, roughly hairy, rooting at the ends or nodes. Radical leaves linear, up to about 1 foot long, the two sides curled together, apex acute, the base forming a tube round the inner leaf bases or stem and covered with long golden hairs, upper surface glabrous, glossy, under surface roughly hairy. Cauline leaves generally only a few inches long ; sheaths covered with long hairs, slightly dilated at the base. Flowers in scorpioid cymes. Cymes in upper leaf axils or at ends of branches, 2 to 6 cymes at a node ; peduncles ·5 inch long or more ; bract shorter or not much longer than the inflorescence ; bracteoles broadly falcate, in two series, overlapping, roughly hairy. Sepals 3, narrowly lanceolate, with long silky hairs, alternating with corolla lobes. Corolla tube broadly funnel shaped, white ; lobes 3, broadly triangular, reddish-purple, tips curved back, thickened and white. Stamens 6 ; anthers orange-yellow ; filaments about twice as long as corolla lobes, inflated near the apex and with a dense beard of mauve hairs. Ovary pale green, pubescent, with 3 vertical ridges along the upper half. Style dilated near the tip and then pointed, with some hairs round the dilated portion but not below. Capsule 3-celled, 6-seeded, without a central column after dehiscence. Seed flat at one end, rounded and with a black disc at the other end, surface warty.

Common in the Tambaram district (College Compound), growing in grassy places and in scrub jungle. Flowers August to March. The flowers are open during the hottest hours of the day, 10—3 (March).

Cyanotis papilionacea, Schult, f.

A small semi-succulent herb. Stem round, erect at first, then branching and spreading along the ground and rooting at the nodes. Leaves lanceolate or oblong, sometimes short and broad, often curved, thick, concave, up to 2·5 inches long, often not more than 1 inch, yellowish-green to reddish, with scattered hairs, tips blunt to sub-acute ; petioles clasping the stem, short. Peduncles usually 2 from the end node of each branch, sometimes one also from the next node below, up to about 2 inches long. Bract triangular or cordate, sometimes longer than the cyme, often no longer than the bracteoles. Bracteoles semi-circular, margins ciliate, apex acute, about ·3 inch long. Cymes curved, with up to about 20 flowers in a double row. Calyx teeth acute, strongly ciliate. Corolla purple. Filaments purple, extending about ·2 inch beyond the corolla tube, dilated to a whitish bulb a little below the anthers, all with a long blue beard along the part below the swelling ; anthers orange. Style as long as the anthers, with a whitish bulb at the tip, sparingly bearded ; bulb tapering to a point above. Capsule 3-celled with 2 seeds in each cell, valves separating more or less from a central trifid column. Seeds about 1 mm. long, blackish, flat at one end and with a small button-like cap with a short point in the middle at the other surface slightly tuberculate.

Very common at Tambaram in sandy places. Flowers December and January.

Commelina undulata R. Br. var. **setosa,** C. B. C.

A prostrate annual herb. Roots thick, dark brown. Stems numerous, running along the ground, thickened at the base and forming a clump. Leaves linear or narrowly lanceolate, curved, usually less than 3 inches long, rather thick, the two sides folded more or less together, tip acute, margins wavy and reddish, slightly pubescent below, bluish-green ; petiole sheathing the stem, dilated and split down one side when branching occurs at the node, reddish, ridged, with bristle-like hairs at the mouth. Spathes with very short peduncles, irregularly funnel-shaped, the two halves pressed together when in flower and gaping when the capsule ripens, up to ·7 inch long and ·3 inch wide, covered externally with short-hooked hairs and long jointed ones. Flowers about ·6 inch across, pale blue. Outer sepal broadly boat-shaped ; 2 inner broadly ovate, concave, joined together for about half their length ; all white with transparent margins. Two petals large, with kidney-shaped lobes and narrow stipes ; third narrowly ovate, small, between the inner calyx lobes. Three stamens reduced to staminodes with short slender filaments and yellow butterfly-shaped sterile anthers ; one with a large anther the two curved cells of which are joined at one

end and diverge at the other ; two stamens with small blue sagittate anthers and long blue filaments arching together. Ovary green ; style blue, sigmoidly curved ; stigma a small knob ; the ovary not maturing in a certain proportion of flowers and the style remaining white and coiled. Capsule 3-celled, splitting into 3 valves, with one seed in each cell. Seeds dull black, almost spherical, about ·12 inch across, with a broad longitudinal scar, almost completely encircled by a dull grey blister-like band between the ends of which there is a small circular depression with a blunt brown point in the middle.

Common in open grassy places. Tambaram (College Compound). Flowers and sets seed during the rains and until the end of March ; the flowering is over by mid-day. The spathes turn brown and fall when the contained capsule is ripe and, owing to their hooked hairs, they cling to hairy surfaces and are probably dispersed by animals.

There is also at Tambaram and Vandalur what appears to be another form of this plant. It grows in the shade of bushes and trees ; its stem is at first erect but later it straggles over the undergrowth and may attain a length of over 5 feet. Its leaves are linear-lanceolate up to 6 inches by ·6 inch. The margins of the leaves appear to be straight and smooth, but are actually minutely serrate. Its spathes, flowers, capsules and seeds are very similar to those described above and it, therefore, appears to be the same species.

C. undulata is in many ways similar to *C. paleata,* Hassk, and has often been confused with it. The latter can be distinguished by its long peduncled spathes which are up to 1·3 inches long, and by its broadly lanceolate leaves. Diagram C on Plate XXXV of the main volume is evidently *C. undulata* var *setosa,* and not *C. paleata.* It is very doubtful whether the latter species occurs in the eastern districts of the Presidency, and it has not been included in the revised key for this genus.

Phoenix farinifera, Roxb.

Plate VII-B

A low shrub. Stem up to 3 feet, usually shorter and hidden by the leaf bases. Leaves numerous, pinnate, usually about 4 feet long ; rachis flattened near the base in the plane of the leaf, at the upper end flattened at right angles, and approximately triangular in the middle ; leaflets about 100, irregularly alternate and standing approximately in 4 rows, mostly at about right angles to the rachis, up to about 11·5 inches long, usually shorter, ·6 inch wide, the two sides folded together and usually standing at less than 90° to each other, the folded base attached to the rachis by a prominent yellow pulvinus, apex bearing a sharp spine, both surfaces bright green and glossy, the lowest reduced to short flattened spines. Inflorescences numerous, in the leaf axils, male and female flowers on different plants. Spathes leathery or woody, smooth and finely striated longitudinally, ovate, flattened, with 2 keels ; keels smooth or with a short brownish fringe ; apex flattened,

truncate. Male flowers in branched spikes each inflorescence consisting of about 35 simple spikes each containing 25—30 flowers ; main spadix flattened on the inner side and convex on the outer ; branches irregular, dilated at the base. Calyx cup-shaped with 3 obtuse teeth alternating with the corolla lobes, cream-coloured. Corolla of 3 thick, ovate, concave, yellowish lobes. Stamens 6 ; anthers elongated, winged, often all or several joined at the tip ; filaments thickened and fused together ; pollen copious, white ; grains ovoid, about ·01 × ·02 mm. Female flowers arranged as in male inflorescence but usually with fewer branches and fewer flowers to each spike. Calyx cup-shaped with 3 obtusely keeled teeth. Corolla of 3 greenish-yellow petals closely folded over each other and round the ovary so that only the 3 diverging stigmas are visible. Ovary of 3 compressed but separate carpels ; stigmas one to each carpel, curved ; staminodes present but flattened and obscure. Berries one-seeded, ovoid, bright red, glossy, with a mucronate tip, the calyx and corolla forming a green scaly cup at the base, about ·7 × ·3 inch, becoming black when quite ripe ; flesh mealy, pleasant-flavoured. Seed oblong, light brown with a deep longitudinal groove, ·5 inch long.

One of the commonest plants in scrub jungle in the Tambaram district. Flowers December to February. Fruit ripens January to April. Each plant does not appear to flower each year, as at the flowering time numerous mature plants are found without inflorescences. The leaves are used for mat and basket making and the pith of the stem is edible.

Theriophonum, Bl.

Tuberous herbs. Leaves few, cordate, sagittate or hastately 3-lobed ; petioles long. Spathe tubular below, slightly constricted at the mouth, limb erect, oblong or lanceolate, acuminate or subcaudate. Spadix included, slender. Male and female flowers well separated. Perianth 0. Stamens 1—2, aggregated in a narrow, cylindric mass 3—5 times longer than the female inflorescence ; anthers subsessile, globose, connective thin, sometimes produced. Ovaries usually few, oblong, 1-celled ; stigmas sessile ; ovules few to many, basal or apical. Neuters below rather long, filiform, upper shortly subulate, uppermost sometimes verrucose. Berries ovoid. Seeds ovoid, erect or pendulous ; albumen copious.

Theriophonum minutum, Engl.

A perrenial tuberous monoecious plant. Tubers up to 1·75 inches across, white, roundish in young plants, becoming irregular in later stages by partial division into several tubers, up to about 7 inches below ground. Roots long, white, fibrous, emerging from the base of the stem above the tubers. Leaves radical ; blade up to 4 × 5 inches, very

variable in shape from broadly cordate to narrowly hastate, usually ovate with a triangular or ovate lobe on each side at the base, upper surface darkish green with a waxy lustre, under surface lighter, glossy ; petioles up to 14 inches long, channelled, part below ground white. Inflorescence solitary. Peduncle slender, the upper end just above the ground. Spathe up to 5·5 inches long, constricted between tube and limb and purple at the constriction on the inner surface ; tube irregularly oval, having a somewhat dilated base at the back and being somewhat flattened in front, pale-green ; limb erect, boat-shaped to broadly ovate, very pale green, not striated, margins finely frilled and deep reddish-purple, apex acute. Spadix up to about 3 inches long, straight, not exserted from the spathe ; flowers without perianth ; females at the base, up to about 17 ; after a short bare space there is a group of up to 30 long neuters ; above these about ·7 inch covered with males ; then ·25 inch covered with short neuters, and finally an appendage about 1·5 inches long, dimensions smaller in most specimens. Ovary green, flattened ; stigmas white, tufted, as wide as ovaries. Long neuters purple, filiform, ·25 inch long, tips blunt and turned upwards. Males with short curved purple beaks, all shedding their pollen on the same day. Pollen yellow, grains spherical. Short neuters filiform, about 1/10 the length of the long ones. Appendage deep purple, enlarging at the base from the narrow fertile part of the spadix, tapering to a blunt tip. Berries purplish-black above, white at the base, containing up to 9 seeds but little or no pulp. Seeds attached to both top and bottom of the cell, lemon-shaped, longitudinally ridged, ridges dark green, grooves brown, tip white.

Common in shady and damp places, such as tank bunds, near Tambaram ; also under trees and shrubs in scrub jungle at Vandalur. Flowers during the rains (November and December). Fruits in December and January.

The plant described on page 300 of the Flora of Madras City as *Typhonium divarcatum,* Decne. and depicted in drawing C on Plate XXXVII is *Theriophonum minutum.* In F.P.M., *Typhonium divarcatum* is described as occurring on the E. Coast but as not being common. The writer has not found it near Madras, but has found it to be common near Trivandrum.

Theriophonum Wightii, Schott.

A perennial tuberous herb. Leaves radical, very narrowly hastate ; midlobe up to about 4·5 inches long and ·25 inch wide ; side lobes up to 2 inches long, narrower than the central lobe. Spathe up to about 5 inches long, pale greenish-yellow, margin of limb purple, waved. Spadix shorter than the spathe. Female flowers about 11, at the base of the spadix ; ovaries light green, spherical ; stigmas yellowish, tufted, sessile. Above the females there is a bare area of the spadix about ·12 inch long, then about ·25 inch bearing filiform bluntly-pointed brownish-purple neuters about ·25 inch long, then about ·4 inch bearing dark purple shortly-beaked males, then, after a short bare space, about

·25 inch bearing numerous short neuters (about ·03 inch long), and finally a narrowly conical appendage about ·8 inch long. The appendage is somewhat verrucose at the base. When the spathe opens the appendage is liver-coloured but it becomes dark grey at a later stage. Berries and seeds as in *T. minutum.*

Tambaram and Puttur. Flowering November to January. The identification of specimens of this plant from Tambaram was confirmed by Kew. A careful comparison of living specimens of the inflorescence of this plant with that of *T. minutum* showed them to be essentially identical. The only differences observed were that in *T. minutum* the brownish-purple band on the inside of the spathe at the constriction between the tube and the limb was more strongly marked, and in *T. Wightii* the anthers were more definitely beaked than in *T. minutum.* The berries and seeds of these two plants appear to be indistinguishable. Leaf shape therefore appears to be the only distinction between these species, and as leaves varying considerably in shape are often found on the same plant in *T. minutum,* it appears to be doubtful whether these two plants should be regarded as specifically different.

Amorphophallus sylvaticus, Kunth

Plate, VII-C

A tuberous perennial plant. Tuber up to 5 inches across, globose, flattened. Roots emerging from the upper side of the tuber round the scape or petiole. Irregular fleshy underground stems emerging from the tuber and forming buds which develop into small tubers on the underside of the stem. Not more than one leaf formed at the same time. Leaves varying with the age of the plant ; first leaf produced having 5 ovate lobes palmately arranged one in the middle on a short petiolule and 2 at each side on common petiolules ; the next leaf having the lowest side-lobes on each side divided into two almost to the base and sometimes the midlobe more or less divided into two ; subsequent leave becoming more and more complex, the latest having upwards of 50 lobes variously attached by the three branches at the base ; each lobe having a central rib and a number of pinnately arranged nerves each of which arches upwards and joins the nerve above forming an intramarginal nerve ; tips of lobes acute or shortly cuspidate ; upper surface darkish green ; under side lighter, glossy ; petiole solid, succulent, mottled. Inflorescence solitary, the same plant not producing a leaf the same season. Peduncle cylindrical, smooth, up to 18 inches long, strongly mottled with olive-green or brown on a white, light pink or light grey ground. Spathe campanulate with a short triangular limb, one edge overlapping the other, up to about 2·5 inches long, outer surface almost white with dull green patches and numerous parallel nerves, inner surface dark purple below becoming lighter above. Spadix cylindrical, long exserted from the spathe ; lowest ·7 inch covered

with female flowers consisting of bright green ovaries with short styles and large yellow bilobed sticky stigmas ; next ·5 inch covered with flat diamond-shaped neuters, purple in early stages, later becoming yellow or white ; above these 1·5 to 2 inches covered with male flowers consisting of irregular groups of 3 to 5 roundish bodies (anthers) varying in colour from black to purple or brown ; anthers opening by pores in sides ; pollen grains spherical ; appendage tapering to a blunt tip, about 8 inches long, purple, light brown or bright yellow with a sticky lustre, somewhat warty or wrinkled. Ripening peduncle with up to 100 berries ; berries ovoid ·5 inch long, scarlet, glossy, usually 2-seeded. Seeds semi-ovoid, purplish or brownish-green, flesh white.

Common in a few restricted areas near Tambaram—Irumbuliyur tank bund, tank bund near Nedunkundram. Flowers in August. Berries ripen in November and December. Leaves found throughout the cooler and moister months. This plant has not previously been reported from this part of the Presidency. The inflorescence has a strong offensive smell like that of certain bugs.

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PLATE I.

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B. Rhynchosia suaveolens, DC. × 1/2.

C. Pterocarpus Marsupium, Roxb.

1. Twig with two leaves × 1/2.
2. Pods × 1/2.

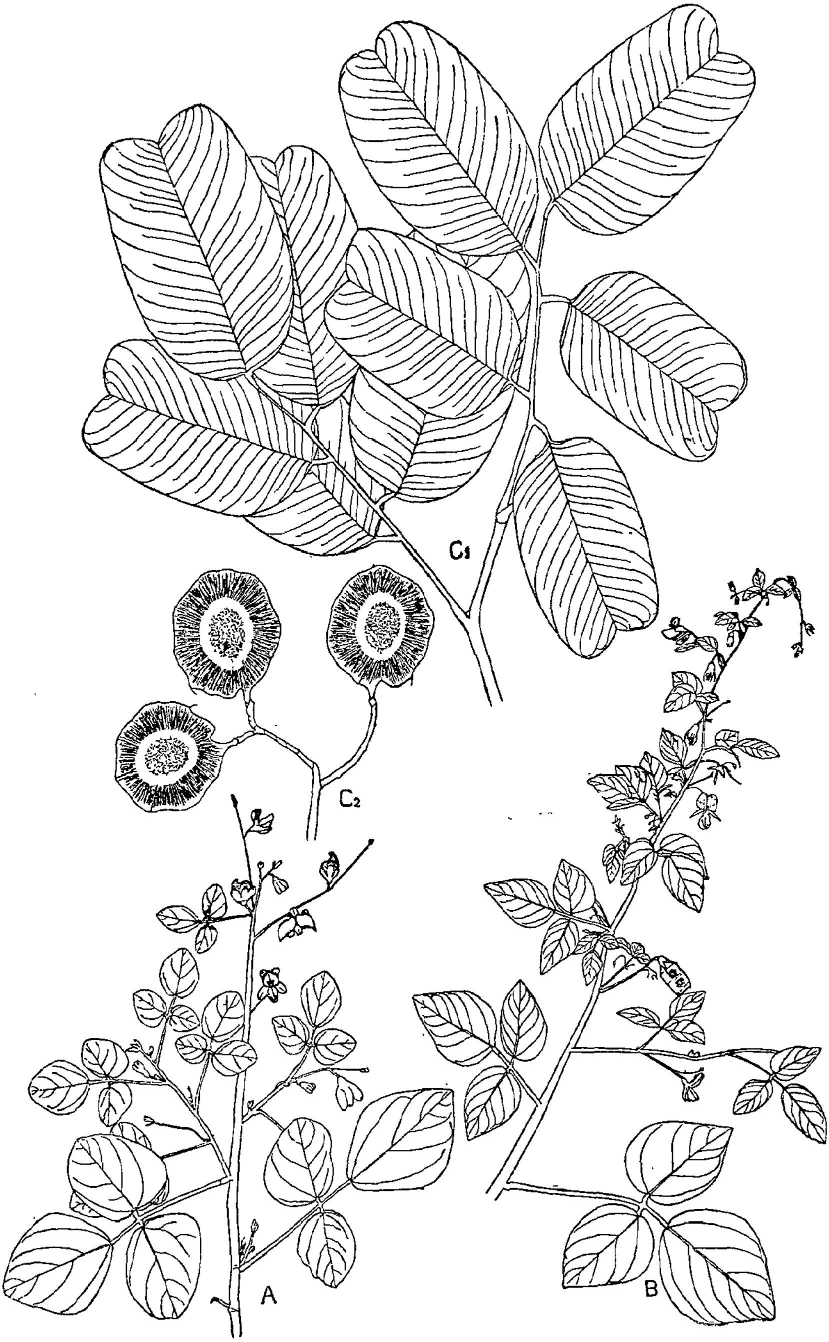
C1
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PLATE II.

A. Anogeissus latifolia, Wall, × 1/2.

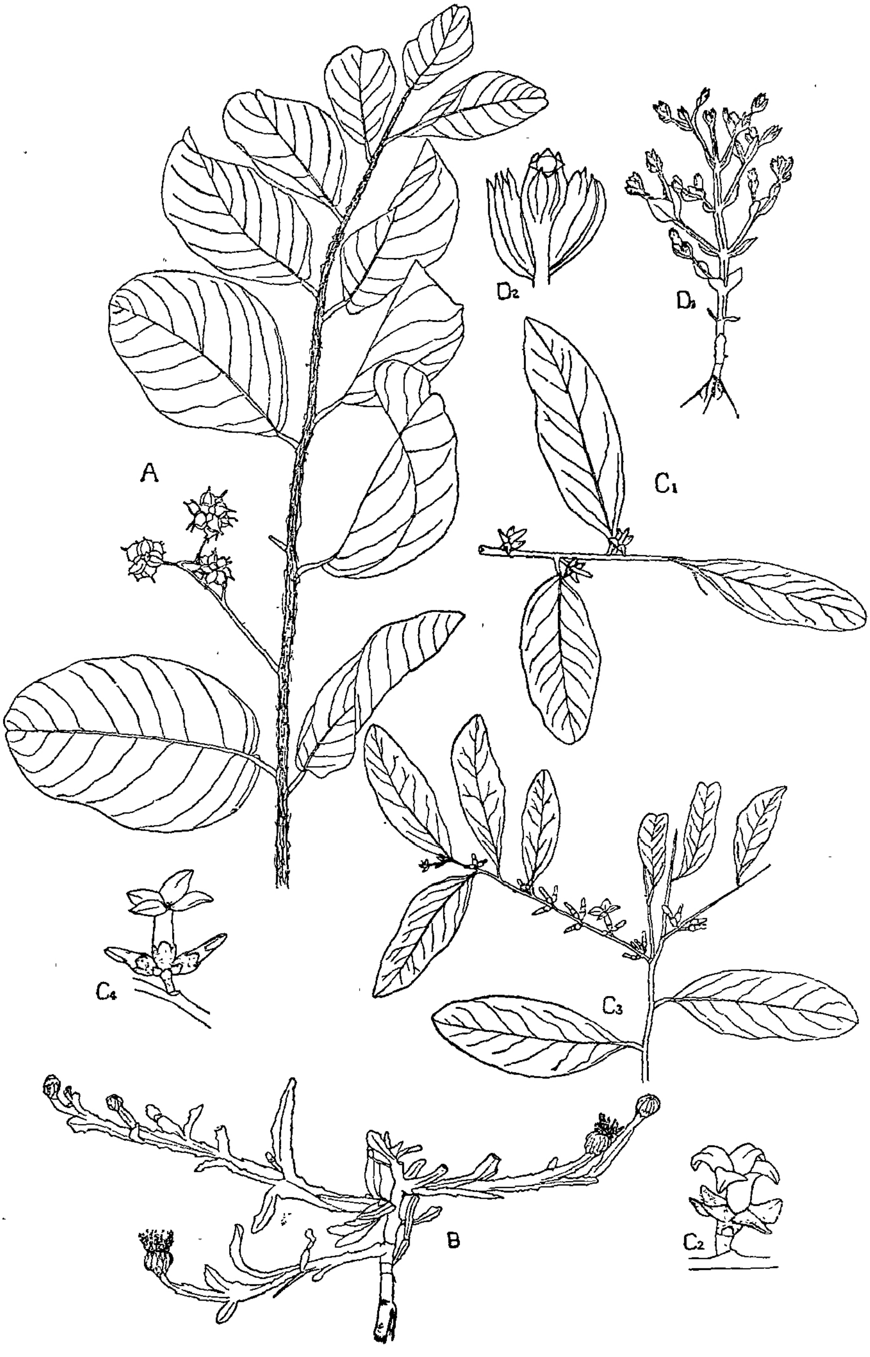
B. Epaltes pygmæa, DC. × 1.

C. Diospyros Ebenum, Koen.

1. Branchlet of female plant × 1/3.
2. Female flower × 1.
3. Branchlet of male plant × 1/3.
4. Cyme with male flowers × 1.

D. Hoppea dichotoma, Willd.

1. Whole plant × 2/3.
2. Cyme × 6.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C2

PLATE III.

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B. Limnophila racemosa, Benth.

1. Whole plant × 1/6.

2, 3, 4, 5. Stages in the variation of the leaves on passing up the stem × 1/2.

6. Flower × 2/3.

7. Capsule × 2/3.

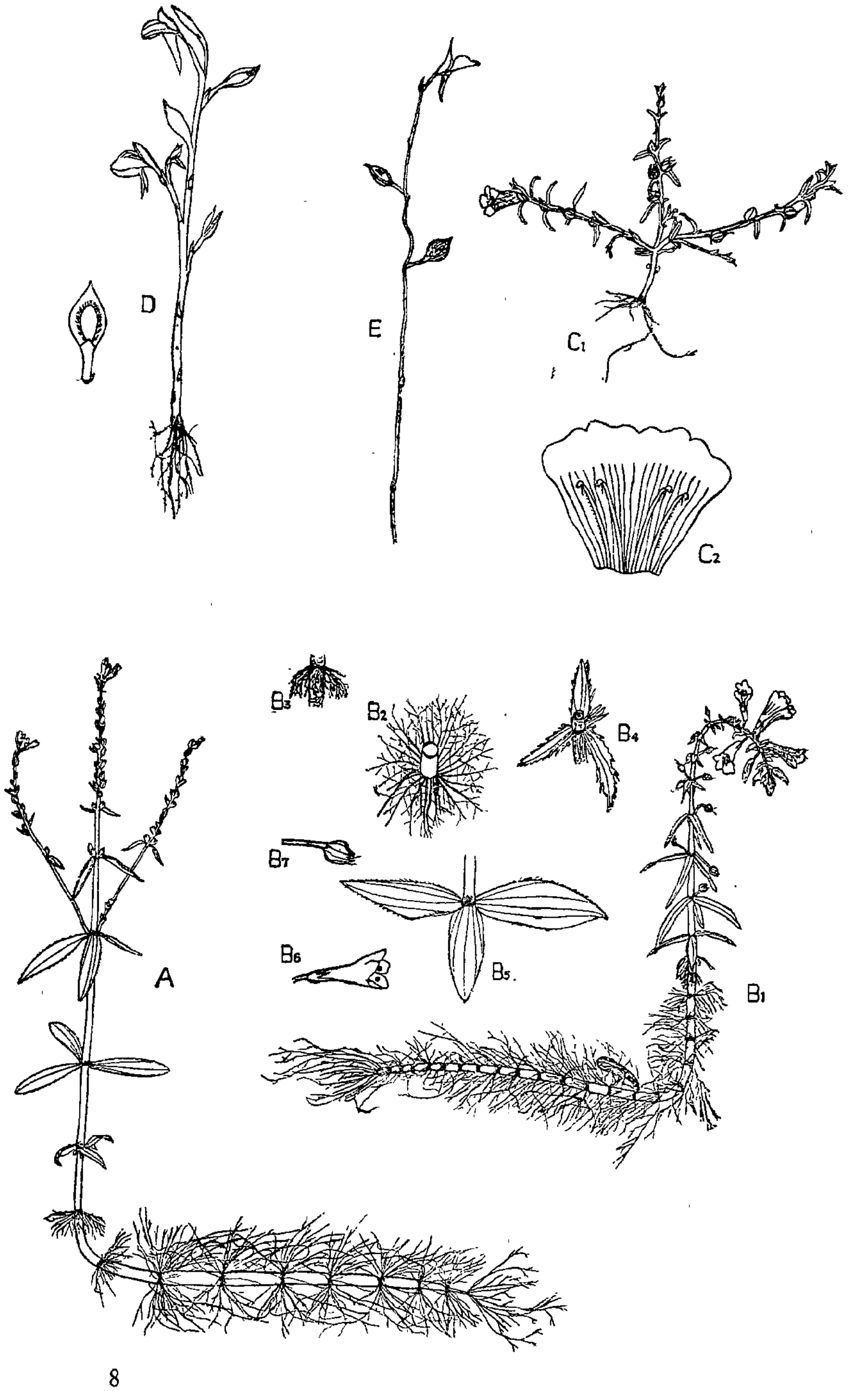
C. Centranthera humifusa, Wall.

1. Whole plant × 1/2.

2. Opened corolla tube × 2.

D. Utricularia stricticaulis, Stapf × 1.

E. Utricularia Wallichiana, Wt. × 1.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B5.
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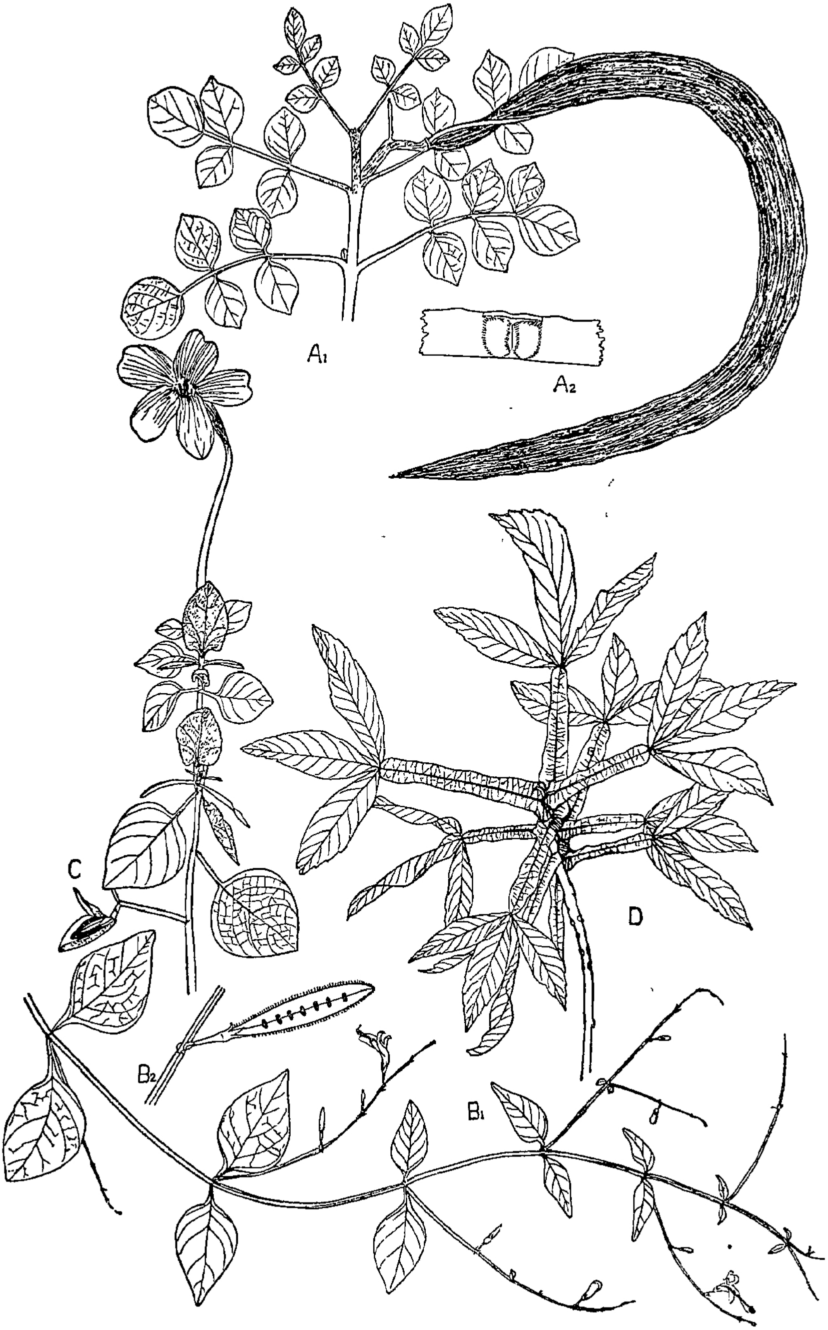
C. Barleria longiflora, Linn. f. × 1/2.

D. Vitex altissima, Linn. f. × 1/4.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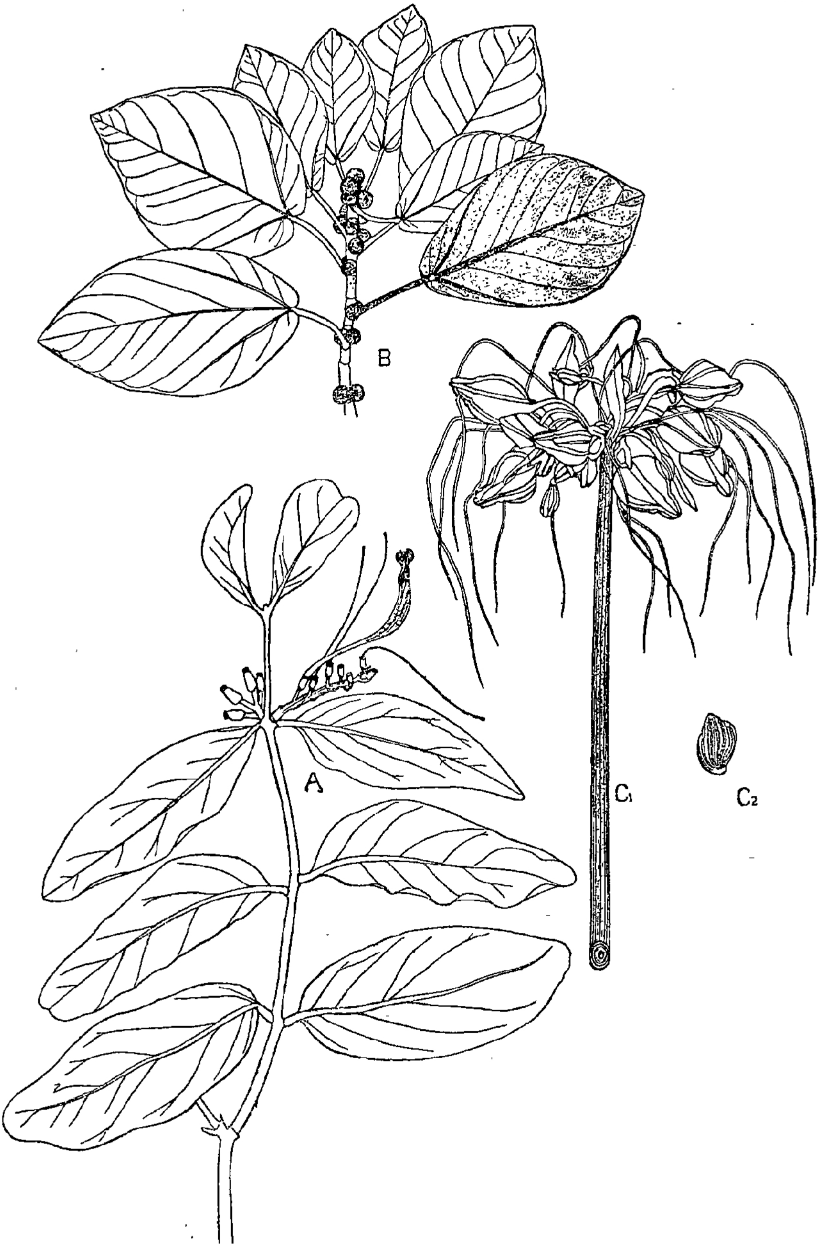
B. Ficus tomentosa, Roxb. × 1/3.

C. Tacca pinnatifida, Forst.

1. Inflorescence × 1/2.
2. Seed × 2.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2. Tuber × 1/3.

B. Dioscorea oppositifolia, Linn.

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3. Spray of male plant × 1/3.

B1
B2
A1
B3
A2

PLATE VII.

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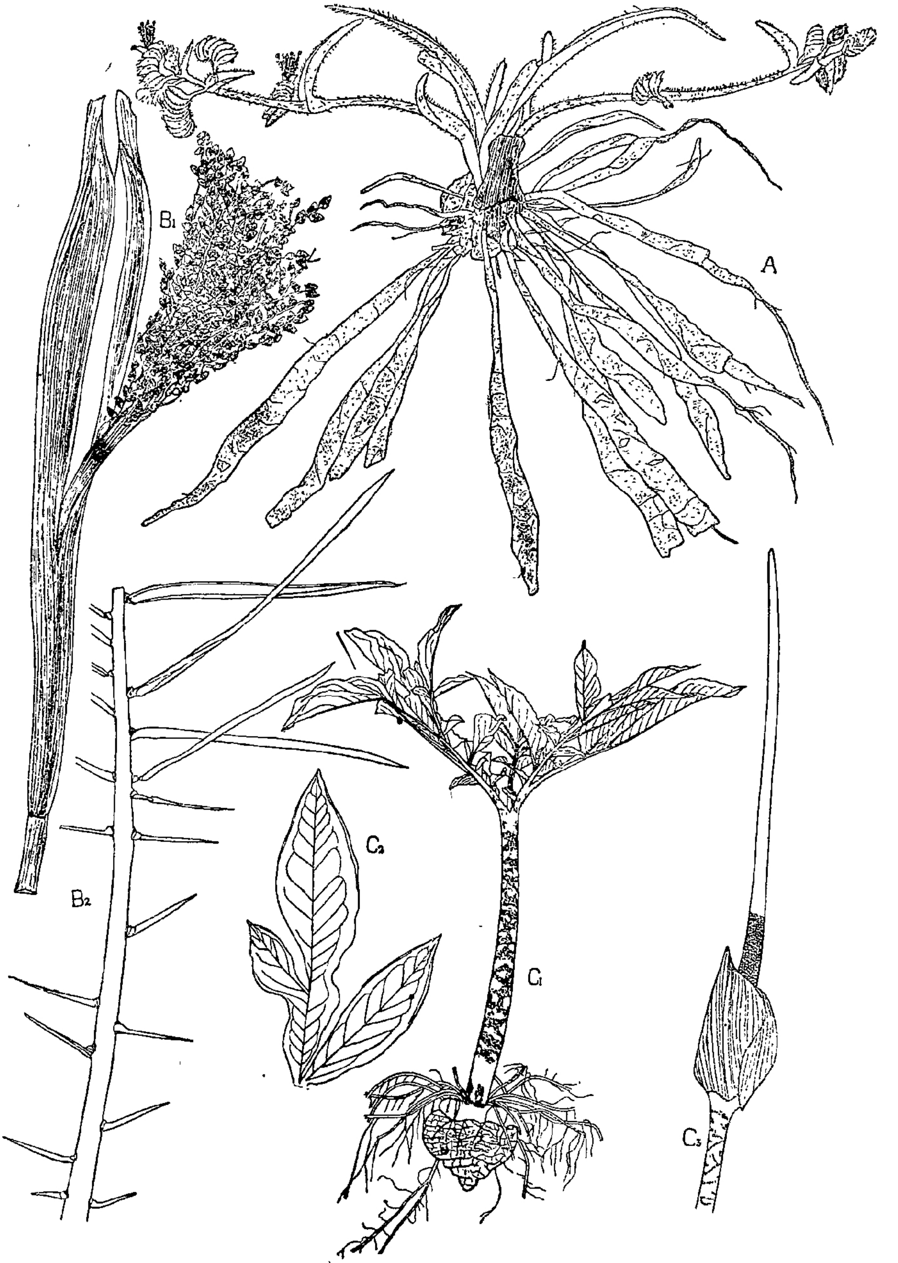
C. Amorphophallus sylvaticus, Kunth

1. Tuber and leaf × 1/4.
2. Portion of leaf showing venation × 1/2.
3. Inflorescence × 1/2.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